

# **Modified Access Decision Report**

## **I-5/I-205 at NE 134<sup>th</sup> Street Interchange**

**Final**

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# Modified Access at the NE 134<sup>th</sup> Street Interchange

## Modified Access Decision Report

### EXECUTIVE SUMMARY

The purpose of this *Modified Access Decision Report* is to provide the necessary information, evaluation, and recommendations to make a decision regarding the engineering and operational feasibility of proposed modified access for the NE 134<sup>th</sup> Street interchange area. This interchange is located in Clark County within the Vancouver urban growth area north of the Vancouver city limits, and is an integral part of several transportation systems, including the I-5 and I-205 corridors. These corridors are heavily utilized by motorists and serve as major freight routes.

#### Background

This report builds on the previously completed *I-5/I-205 North Corridor Study*. The results of this study are included in the *I-5/I-205 North Corridor Strategy Report* (Parsons Brinckerhoff for WSDOT, January 2001). The intent of this *Modified Access Decision Report* is to justify a modified access request for the existing NE 134<sup>th</sup> Street interchange area along I-5 in Clark County.

The I-5/134<sup>th</sup> Street interchange study corridor encompasses two interstate systems, and is defined as the I-5 mainline between the NE 99<sup>th</sup> Street and NW Pioneer Street/SR 501 interchange. The study corridor also includes the I-205 mainline between the NE 83<sup>rd</sup> Street/Padden Parkway interchange and the junction with I-5 north of NE 134<sup>th</sup> Street.

**Figure 1** shows the study corridor.

Essentially, the NE 134<sup>th</sup> Street interchange is an arterial interchange located at the junction of I-5 and I-205. Due to the intersection of these two major interstates, access to the NE 134<sup>th</sup> Street interchange is somewhat unique. Although full movements are provided to and from NE 134<sup>th</sup> Street, I-5, and I-205, ramp locations result in confusing return access for out-of-area interchange users.

Because of several factors, including the unique placement of this interchange at the junction of two major interstates and the amount of commercial and residential growth taking place in the area, traffic operations have deteriorated over time and will continue to do so given the existing configuration. This has led to degraded mainline interstate operations along I-5 and an increase in the number of accidents. Traffic projections indicate that this would also affect I-205 traffic operations. The projected congestion is largely due to the significant increase in ramp queues and spillbacks occurring onto the mainlines of I-5 and I-205.

This report proposes a preferred operational alternative with a modified interchange design that, when compared to the future no-build scenario, is anticipated to improve traffic operations and avoid ramp queuing that may spill onto the I-5 and I-205 mainlines. Included in the preferred operational alternative are access modifications to I-5 and to I-205, as well as local system

improvements that serve to alleviate interchange congestion and provide additional mobility for local and regional trips.

### **Purpose and Need**

The purpose of this access modification project is to alleviate current and future congestion and accident problems on the I-5 and I-205 mainlines by modifying access at the NE 134<sup>th</sup> Street interchange.

Additional project objectives are to:

- Improve regional mobility between central and west Clark County and the rest of the region;
- Improve traffic operations on NE 134<sup>th</sup> Street; and
- Improve public transportation access and operations and encourage use of the HOV system.

### **Preferred Operational Alternative**

Please refer to **Figure 2** for an illustration of the preferred operational alternative. The proposed interchange design at NE 134<sup>th</sup> Street would include:

- Reconfiguring the northbound on-ramps and southbound off-ramps on I-5 and I-205 to a full diamond interchange at I-5 and NE 134<sup>th</sup> Street, with closure of the existing I-5 northbound on-ramp and southbound off-ramp at NE 134<sup>th</sup> Street.
- Closing the existing southbound on-ramp to I-205 and replacing it with a flyover ramp to I-205 southbound, with a terminus at the northbound off-ramp signal at NE 134<sup>th</sup> Street and NE 23<sup>rd</sup> Avenue. A separate right-turn-only ramp lane from northbound NE 20<sup>th</sup> Avenue onto the I-205 southbound on-ramp utilizing the existing ramp will provide additional access to southbound I-205.
- Adding a new off-ramp from I-205 northbound to northbound NE 20<sup>th</sup> Avenue and a new on-ramp to southbound I-205 from northbound NE 20<sup>th</sup> Avenue.
- Adding a new collector crossing of I-5 at NE 139<sup>th</sup> Street to accompany the planned new crossing at NE 154<sup>th</sup> Street. Both crossings would connect NE 10<sup>th</sup> Avenue with NE 20<sup>th</sup> Avenue and develop a local circulation system to relieve 134<sup>th</sup> Street through the interchange area.
- Relocating the Salmon Creek Park-and-Ride to a location west of I-5 away from its current location within the interchange.
- Adding new (south) direct-access High Occupancy Vehicle (HOV) ramps from I-5 to the new NE 139<sup>th</sup> Street crossing.
- Continuing to plan for a collector extension at approximately NE 23<sup>rd</sup> Avenue, to connect the northbound I-205 off-ramp with NE 139<sup>th</sup> Street, as shown in Clark County's *Salmon Creek/Fairgrounds Regional Road Plan*.
- Moving forward with the proposed Highway 99 realignment project between NE 129<sup>th</sup> Street and NE 139<sup>th</sup> Street.

**Figure 1. I-5/I-205/134<sup>th</sup> Interchange Study Area**



**Figure 2. 134<sup>th</sup> – Preferred Operational Alternative**





## **Problem Statement**

The *I-5/I-205 North Corridor Study* (Parsons Brinckerhoff for WSDOT, 2001) identified several mobility deficiencies for regional trips to and from north and central Clark County on routes that lead to I-5, many of which funnel into the NE 134<sup>th</sup> Street interchange. Current and future congestion on NE 134<sup>th</sup> Street in the interchange vicinity leads to near-gridlock conditions on NE 134<sup>th</sup> Street, and causes peak period ramp delays and queues that at times extend onto the I-5 mainline during peak hours, and are expected to extend onto the I-205 mainline. These are projected to become daily occurrences before the Year 2025. This affects interstate mainline traffic operations and exacerbates the existing high accident condition in the interchange vicinity.

To address these deficiencies, the *I-5/I-205 North Corridor Study* recommended proceeding with modified access at the NE 134<sup>th</sup> Street interchange and creating a *Modified Access Decision Report* for the proposed access modification.

## **Existing and Future Congestion**

NE 134<sup>th</sup> Street serves the travel shed for a large portion of west-central Clark County, including the North Salmon Creek, Mount Vista, and north Hazel Dell areas, and the relatively new Vancouver campus of Washington State University. It is a multi-lane arterial roadway with numerous at-grade signalized intersections spaced in close proximity to each other within the interchange area. **Figures 3 and 4** show the central and west Clark County travel sheds that this interchange serves. **Figure 3** shows the travel shed for trips originating from the I-205 area (southern portion of the study area) and **Figure 4** shows the travel shed for trips originating from I-5 (both northern and southern portions of the study area). These figures are based on year 2025 regional travel demand projections by the Regional Transportation Council (RTC), the Metropolitan Planning Organization for Clark County. Both of these figures show that the interchange serves primarily regional trips (interstate trips between Portland and Vancouver, longer-distance commute and freight trips between urban areas), consistent with the intended function of an interchange on the Interstate system. Because of the lack of a continuous parallel arterial system, the Interstate is the logical and desired travel path for these longer-distance trips.

As congestion increases on NE 134<sup>th</sup> Street, the geometric constraints between intersections along 134<sup>th</sup> Street result in queues extending through adjacent intersections on NE 134<sup>th</sup> Street, which also cause queues to back onto the northbound off-ramps from I-5 and I-205 during the PM peak. Currently, queues often extend onto the mainline of I-5 and are expected to extend onto I-205 at some point in the short-term future, likely within ten years.

With rapid commercial and residential growth, congestion and accidents have increased on I-5 and I-205 in the NE 134<sup>th</sup> Street interchange vicinity, and portions of NE 134<sup>th</sup> Street, I-5, and I-205 are currently deficient or projected to be deficient within ten years (level-of-service E/F). Regional trips primarily travel to and from Portland and Vancouver to the south, and to northern Clark County and Cowlitz County.

## **Geometric Constraints**

The existing ramp onto southbound I-205 from NE 134<sup>th</sup> Street is also problematic due to its close proximity to the intersection with NE 20<sup>th</sup> Avenue (approximately 100 feet). As traffic increases on NE 134<sup>th</sup> Street and at the adjacent NE 20<sup>th</sup> Avenue/NE 134<sup>th</sup> Street Intersection,

turning movements for traffic approaching this ramp on NE 134<sup>th</sup> Street will become problematic and affect the level-of-service (LOS), both existing and future, on NE 134<sup>th</sup> Street. The close proximity of structures to the existing public right-of-way also limits the design modification options.

### **Safety Issues**

Interstate 5 from south of the NE 134<sup>th</sup> Street interchange to north of the I-5/I-205 junction has been designated a High Accident Corridor. Although interim improvements have been made to the I-5/NE 134<sup>th</sup> Street interchange, it is projected to have a deficient LOS in the short-term, likely within ten years. Additionally, Year 2025 projections indicate that northbound off-ramp queues extending onto the I-5 and I-205 mainlines will increase the risk of a higher accident rate on the interstate system and will likely exacerbate the existing high accident condition at the interchange.

Vehicles traveling to and from NE 134<sup>th</sup> Street from I-5 north of the interchange must weave across multiple lanes to enter or exit I-5. This contributes to current and future congestion levels and to the high accident rate on I-5 between I-205 and NE 179<sup>th</sup> Street. This situation is worsened by the number of vehicles changing lanes in this section to exit/enter the mainline at NE 179<sup>th</sup> Street and at 134<sup>th</sup> Street using I-205. The section of I-5 between NE 134<sup>th</sup> Street and NE 179<sup>th</sup> Street, including the I-205 junction, was designated a High Accident Corridor in the WSDOT 1999-2018 Highway System Plan. The preferred operational alternatives for both the 134<sup>th</sup> Street interchange and for the 179<sup>th</sup> Street/219<sup>th</sup> Street interchanges have been analyzed together to ensure that these alternatives will improve on the existing situation, and not exacerbate the high accident condition.

### **Transit and HOV Operations**

Transit trips are affected by increased congestion at the 134<sup>th</sup> Street interchange. Buses and carpools currently using the Salmon Creek Park-and-Ride experience significant delays while exiting I-5 during the PM peak, and delays will increase by the Year 2025. This discourages HOV trips, which in turn, limits the ability to alleviate mainline congestion. A component of the preferred operational alternative relocates the Salmon Creek Park-and-Ride to provide better access, expand capacity, and improve 134<sup>th</sup> Street interchange traffic operations. Another component includes construction of new HOV-only ramps between I-5 and NE 139<sup>th</sup> Street to provide access to and from I-5 south of the interchange. Both of these are intended to improve interchange traffic operations, as well as implement transportation demand management measures as part of the preferred operational alternative.

Since the implementation timeline of the northbound HOV lane is uncertain, WSDOT has decided that in the interim, upon completion of the 134<sup>th</sup> Street preferred operational alternative the northbound ramp to NE 134<sup>th</sup> Street will be restricted to buses only. This restriction will be removed when HOV is implemented on northbound I-5.

For southbound I-5, since HOV has already been implemented, the ramp from NE 134<sup>th</sup> Street will be open to all eligible HOV (including motorcycles).

**Figure 3. Year 2025 PM Peak I-205/134<sup>th</sup> Street Trip Origins and Destinations To and From the South**



**Figure 4. Year 2025 PM Peak I-5/134<sup>th</sup> Street Trip Origins and Destinations**



To ensure the preferred operational alternative with the interim bus-only ramp to NE 139<sup>th</sup> Street will not adversely impact the I-5 mainline, the operational analysis using Synchro and HCM was rerun. The results are contained in Appendix G. The interim operation of the preferred alternative will not adversely impact the I-5 mainline.

## **Access Decision Criteria**

This section summarizes the eight policy points that both the Washington State Department of Transportation and the Federal Highway Administration (FHWA) require to be addressed when proposing new or modified access on the Interstate System. An agreement between WSDOT and FHWA allows the report to focus on policy requirements incorporated in WSDOT's Design Manual Chapter 1425. This report responds to the DM1425 requirements. The full report detailing these eight points follows this Executive Summary and is structured to meet both the WSDOT and FHWA requirements. The technical memoranda that support the analysis and conclusions in this *Modified Access Decision Report* are contained in the Technical Appendices included at the end of the report.

### ***Policy Point One: Future Interchanges***

*The preferred operational alternative is consistent with the I-5/I-205 Route Development and Corridor Plan and surrounding network plans. There are no new interchanges planned between the NE 134<sup>th</sup> Street interchange and any other adjacent interchange on either I-5 or on I-205.*

The I-5/I-205 North Corridor Study and Route Development Plan recommended modified access at the I-5/I-205/NE 134<sup>th</sup> Street interchange. The preferred operational alternative proposed in this access decision report is consistent with the design alternatives for the modified access which were forwarded from the corridor study. The corridor study also examined traffic circulation on the surrounding arterial system and recommended several local improvements, including new crossings of I-5 along NE 139<sup>th</sup> Street and NE 154<sup>th</sup> Street, a north-south collector between NE 134<sup>th</sup> Street at the northbound I-205 off-ramp and NE 139<sup>th</sup> Street, and improvements to NE 134<sup>th</sup> Street and NE 10<sup>th</sup> Avenue, which are included in the preferred operational alternative.

A new access component of the preferred operational alternative is new HOV-only ramps to the new 139<sup>th</sup> Street overpass from I-5 south of the interchange.

Southbound, the ramp from NE 139<sup>th</sup> Street would become the left (HOV) lane of the I-5 mainline. HOV has been implemented for southbound I-5 widening from Salmon Creek to 134<sup>th</sup> Street. The HOV operations of the ramp and HOV lane are consistent.

For northbound I-5, implementation of an HOV lane on I-5 is dependent on replacement of the Interstate Bridge across the Columbia River and future congestion levels warranting an HOV lane. The timeline is uncertain. To avoid operation issues with the HVO ramp from northbound I-5 to 139<sup>th</sup> Street and the lack of an HOV lane on northbound I-5, WSDOT has decided to restrict the off ramp to buses only in the interim.

The operational analysis of the preferred alternative was carried out with both the interim and the ultimate preferred operational alternative. In both cases, the HOV off-ramp does not experience queues onto the I-5 mainline, and there are no adverse impacts on the adjacent 134<sup>th</sup> Street ramp or other adjacent interchanges. The analysis is contained in Appendix G.

Interchange modifications at the NE 179<sup>th</sup> Street interchange and a new NE 219<sup>th</sup> Street interchange are being proposed as part of the separate *Access Decision Report* for I-5 between the NE 179<sup>th</sup> Street and Ridgefield interchanges. Analysis conducted as part of this report and the *Modified Access Decision Report* for I-5 between the NE 179<sup>th</sup> Street and Ridgefield interchanges indicates that the preferred operational alternative for the NE 134<sup>th</sup> Street interchange will not negatively affect mainline or interchange operations at adjacent interchanges and is consistent with the I-5/I-205 Corridor Plan developed from the previous corridor study.

***Policy Point Two: Land Use and Transportation Plans***

*The NE 134<sup>th</sup> Street interchange preferred operational alternative is consistent and compatible with all local, regional, and state plans for the area.*

Local plans include the *Clark County Comprehensive Growth Management Plan* and the *Arterial Atlas*, which is a component of the Comprehensive Plan that serves as the local arterial plan. The NE 134<sup>th</sup> Street interchange modification is included in the *Arterial Atlas*. It is located within the Vancouver Urban Growth Area and as such, is included in the Transportation and Land Use elements of the Comprehensive Plan, and will not encourage growth that is inconsistent with the Comprehensive Plan. All local system improvements included in the preferred operational alternative, with the exception of NE 139<sup>th</sup> Street, are consistent with the Comprehensive Plan. A comprehensive plan amendment would be necessary to add the NE 139<sup>th</sup> Street crossing to the Comprehensive Plan; discussions with county staff indicate that this component is compatible with the comprehensive plan, provided that funding for its construction is identified.

Regional plans include the *Metropolitan Transportation Plan* (MTP) and the *State Air Quality Implementation Plan* (SIP) for Clark County. The MTP identifies the NE 134<sup>th</sup> Street interchange as a priority project for improvements. It is included in the air quality conformity analysis for the MTP, which was conducted as part of the SIP air quality analysis requirements.

Statewide Plans include the *Washington Transportation Plan* (WTP) and the *Highway System Plan* (HSP). The NE 134<sup>th</sup> Street interchange improvements are included in the HSP, which is an element of the WTP. The WTP is currently under development.

***Policy Point Three: Reasonable Alternatives***

*All reasonable alternatives to the modified access scenario were studied and do not significantly benefit I-5 or I-205 mainline traffic, and do not alleviate short- and long-term ramp queuing issues at NE 134<sup>th</sup> Street. These alternatives have little or no effect on weaving traffic in the critical section between I-205 and NE 179<sup>th</sup> Street.*

The Access Decision process requires the examination of reasonable local improvement alternatives, in lieu of new or modified access to I-5 and I-205. It must be demonstrated that existing interchanges and/or local roads and streets in the corridor can neither “provide the necessary access, nor be improved to satisfactorily accommodate the design-year traffic demands while at the same time providing the access intended by the proposal” (FHWA guidance, Federal Register, 1998).

Several alternatives which did not modify access at I-5 and I-205 were developed and analyzed, including widening the existing interchange ramps and providing additional turn lanes at the ramp termini. The local system improvements analyzed included new crossings of I-5 at NE



139<sup>th</sup> Street and NE 154<sup>th</sup> Street, and relocating the Salmon Creek Park-and-Ride. Alternatives were tested in various combinations of interchange improvements and local system improvements.

These local alternatives, which did not modify access, were developed with the intention of reducing congestion at existing interchanges on I-5, reducing mainline congestion, and providing more capacity on the arterial system for local and regional trips to encourage those trips to use the local arterial system instead of the Interstate system (it was determined that a majority of the trips using the interchange are regional trips which use I-5 as a logical part of their travel path, indicating that local system improvements away from the interchange area would not improve the I-5 or I-205 mainlines).

All of the reasonable local system improvement alternatives (which do not include modified access) were eliminated for the following reasons:

- They do not improve the current and future ramp queuing situation on the I-5 and I-205 northbound off-ramps.
- They do not resolve the close spacing of the NE 134<sup>th</sup> Street/NE 20<sup>th</sup> Avenue intersection with the I-205 southbound on-ramp.
- They do not provide the level of congestion relief on NE 134<sup>th</sup> Street that the access modification alternatives provide.
- They do not improve safety and mobility deficiencies on I-5 between NE 179<sup>th</sup> Street and I-205 (nor on other sections of I-5).
- Improvements to existing ramps at the NE 134<sup>th</sup> Street interchange do not significantly improve mobility for transit and carpool trips that travel on I-5 HOV lanes and access the Salmon Creek Park-and-Ride.

#### ***Policy Point Four: Need for Access Point Revision***

*The review of improvement alternatives which do not modify access at the NE 134<sup>th</sup> Street interchange concluded that these improvements alone would not resolve the deficiencies outlined in the project's purpose and need and that the preferred operational alternative serves primarily regional trips.*

The I-5/I-205 North Corridor Study and local and regional planning studies indicate that the NE 134<sup>th</sup> Street interchange and the I-5 and I-205 mainlines in the interchange vicinity will become deficient before the Year 2025. The operational analysis conducted as part of this access decision study indicated that local system improvement alternatives alone would not resolve the deficiencies. The primary purpose of this modified access project is to alleviate current and future congestion and accident problems on the I-5 and I-205 mainlines by improving the interchange and modifying access to and from the I-5 and I-205 mainlines.

The modified access alternative is known as the preferred operational alternative and would be accomplished by the following methods: providing new crossings of I-5 at NE 139<sup>th</sup> Street and NE 154<sup>th</sup> Street, modifying access points along I-5 and I-205, adding a new ramp from northbound I-205 to northbound NE 20<sup>th</sup> Avenue and a new ramp from northbound NE 20<sup>th</sup> Avenue to southbound I-205, relocating the Salmon Creek Park-and-Ride to a site west of I-5 with access to NE 139<sup>th</sup> Street, and providing direct HOV access between I-5 and NE 139<sup>th</sup> Street near the relocated Park-and-Ride.

### **Policy Point Five: Access Connections and Design**

*The proposal provides fully directional interchanges connected to public roads which are spaced appropriately, and the design meets full design level geometric control criteria.*

The requirements for Policy Point Five of the Access Decision Report are to show that the proposed access can be designed to meet or exceed current standards for the Interstate System. It has been determined that the proposed access in the preferred operational alternative for the NE 134<sup>th</sup> Street interchange can be constructed to full Interstate System standards as described in the WSDOT Highway Design Manual and the AASHTO Policy on Geometric Design of Highways and Streets.

### **Policy Point Six: Operational and Accident Analysis**

*Under the operational and accident analysis, the proposed preferred operational alternative provides maximum safety and operational benefits for the NE 134<sup>th</sup> Street interchange now and for the next 20 years.*

Policy Point Six requires a detailed alternatives evaluation of the traffic operations and safety in the interchange vicinity. Alternatives were evaluated with respect to their ability to alleviate the deficiencies identified in the Purpose and Need Statement. Measures of effectiveness included travel time, delay, speed, vehicle density, and LOS.

The conclusions reached are:

- All other alternatives continue to show a high probability of ramp queues that extend onto the I-5 and I-205 mainlines in the Design Year 2025, which negatively impacts mainline operations and safety. Only the preferred operational alternative fully alleviates the queuing problem.
- Only the preferred operational alternative adequately spaces the NE 134<sup>th</sup> Street/NE 20<sup>th</sup> Avenue intersection and the I-205 southbound on-ramp.
- Alternatives that provide for a full diamond interchange at I-5 and NE 134<sup>th</sup> Street provide some relief to the weaving issue on I-5 between NE 179<sup>th</sup> Street and I-205.
- Alternatives that provide for new crossings of I-5 help relieve congestion on NE 134<sup>th</sup> Street.

Safety analysis included examining the existing High Accident Corridor on I-5, the potential risk of increased accidents on I-205, and predominant accident types and causes. The primary cause of accidents in the section of I-5 near NE 134<sup>th</sup> Street is due to slowed or stopped vehicles using the northbound off-ramp in peak periods. On I-5 between I-205 and NE 179<sup>th</sup> Street, accidents are primarily due to vehicles changing lanes between the two interchanges.

This analysis concluded that the only alternative which provides maximum safety and operational benefits is the preferred operational alternative.

### **Policy Point Seven: Coordination**

*All coordinating projects are contained in the Highway System Plan (state improvements) and the Clark County Comprehensive Plan (local improvements). The preferred operational*

*alternative is in conformance with local, regional, and state land use and concurrency ordinances.*

The interchange modifications proposed here are not directly associated with any land use or development proposals. Adjacent proposals under review include a major commercial center or new hospital proposed on land adjacent to the interchange, and other development proposals along the NE 134<sup>th</sup> Street corridor. Clark County has indicated that without further improvements to the interchange and along NE 134<sup>th</sup> Street, under their concurrency ordinance no further development that adds to traffic delays in the corridor will be allowed to proceed.

Upon receiving FHWA's finding of operational acceptability, WSDOT will seek funding to implement the preferred operational alternative.

This modified access study is being conducted in coordination with the *Access Decision Report* on I-5 between the NE 179<sup>th</sup> Street and Ridgefield Interchanges.

Clark County, WSDOT, and C-TRAN will need to coordinate on implementing the preferred operational alternative, which includes interstate and local arterial improvements and relocation of the Salmon Creek Park-and-Ride. All agencies support this proposal.

***Policy Point Eight: Planning and Environmental Process***

*An environmental analysis was completed as part of the operational study of this interchange, and the appropriate NEPA document will be prepared after FHWA approval of the modified access request. The preferred operational alternative is consistent with local planning requirements. Impacts to the environment will be mitigated consistent with local, state, and federal regulations.*

The project team conducted preliminary environmental screening of alternative design options that were evaluated in this report. A more comprehensive environmental analysis of the alternatives (including compliance with NEPA, the Endangered Species Act, Section 404 of the Clean Water Act, the Clean Air Act, and other applicable federal, state, and local regulations) will occur upon a finding of operational and engineering acceptability by the Federal Highway Administration (FHWA).

The proposed access modification is expected to require environmental impact mitigation that will need to be addressed in the environmental document and project design. Mitigation may include wetlands replacement, culvert upgrades, cultural resources sites, and hazardous material sites. A full analysis of environmental impacts will be undertaken at a later planning stage, to comply with applicable federal, state and local regulations.



## **POLICY POINT ONE: FUTURE INTERCHANGES**

*WSDOT DM1425 Policy: Is the proposed access point revision compatible with a comprehensive (freeway) network plan?*

The guidance for Policy Point One is to document plans for all future interchange additions that may affect the decision to approve the request for modified access at the NE 134<sup>th</sup> Street interchange. The intent of this policy is to provide a comprehensive interstate network analysis, with recommendations that address all proposed and desired access.

### **I-5 Adjacent Interchanges**

The *I-5/I-205 North Corridor Study* examined the I-5 corridor in the study area, as well as the surrounding arterial system, and did not recommend any new interchanges on I-5 between the NE 99<sup>th</sup> Street and NE 179<sup>th</sup> Street interchanges. The study did recommend modifications to the 134<sup>th</sup> Street interchange access points, and also recommended proceeding with a separate access decision report to evaluate modified access to the 179<sup>th</sup> Street interchange as well as a new interchange at NE 219<sup>th</sup> Street.

Modifications to the NE 134<sup>th</sup> Street interchange in the preferred operational alternative are compatible with modifications to the NE 179<sup>th</sup> Street interchange and with a new interchange at NE 219<sup>th</sup> Street. The preferred operational alternative is also compatible with the existing interchanges on I-5 at 99<sup>th</sup> Street and at Ridgefield. The preferred operational alternative also includes new access to provide for HOV-only ramps connecting from the I-5 mainline to a proposed new NE 139<sup>th</sup> Street crossing.

### **I-205 Adjacent Interchanges**

The *I-5/I-205 North Corridor Study* examined a potential new interchange on I-205 between the NE 134<sup>th</sup> Street and NE 83<sup>rd</sup> Street interchanges, at or near NE 50<sup>th</sup> Avenue. The study recommended no further consideration of a new interchange at or near NE 50<sup>th</sup> Avenue, primarily because it would predominantly carry local trips, and because improvements to the surrounding arterial system could be made to provide sufficient capacity. The preferred operational alternative is compatible with the NE 83<sup>rd</sup> Street/Padden Parkway interchange.

### **Interim Bus/HOV Configuration**

A new access component of the preferred operational alternative is new HOV-only ramps to the NE 139<sup>th</sup> Street from I-5 south of the interchange.

Southbound, the ramp from NE 139<sup>th</sup> Street would become the left (HOV) lane of the I-5 mainline. HOV has been implemented for southbound I-5 and is a component of the programmed I-5 widening from Salmon Creek to 134<sup>th</sup> Street. The HOV operations of the ramp and HOV lane are consistent.

For the northbound I-5, implementation of and HOV lane on I-5 is dependent on replacement of the Interstate Bridge across the Columbia River and future congestion levels warranting an HOV lane. The timeline is uncertain. To avoid operational issues with the HOV ramp from northbound

I-5 to NE 139<sup>th</sup> Street and the lack of an HOV lane on northbound I-5, WSDOT has decided to restrict the off ramp to buses only in the interim.

The operational analysis of the preferred alternative was carried out with both the interim and the ultimate preferred operational alternative. In both cases, the HOV off-ramp does not experience queues onto the I-5 mainline, and there are no adverse impacts on the adjacent 134<sup>th</sup> Street ramps or other adjacent interchanges. The analysis is contained in Appendix G.

### **Policy Point One Conclusions**

The NE 134<sup>th</sup> Street interchange access modification is compatible and consistent with the comprehensive freeway plans for I-5 and I-205 in the study corridor. No other additional access is planned adjacent to the NE 134<sup>th</sup> Street interchange.

## POLICY POINT TWO: LAND USE AND TRANSPORTATION PLANS

*WSDOT DM1425 Policy: Is the proposed access point revision compatible with all land use and transportation plans for the area?*

The guidance for Policy Point Two is to show that the proposal ensures consistency with local and regional land use and transportation plans. The report should:

- Describe how the proposed design and access modifications are consistent and compatible with local and regional land use/transportation plans, including the statewide transportation plan;
- Demonstrate that secondary land use impacts caused by future development at a new interchange area would be incorporated into the design and operational analysis or that the proposal will not generate secondary land use impacts; and
- Discuss the corridor improvement recommendations' consistency with Washington State Highway System Plan (HSP) policies.

**Appendix A** contains the Plan Consistency technical memorandum that supports the conclusions of this policy point.

New highway interchanges can significantly impact land development patterns. Although they can provide better motor vehicle access, if nearby land use patterns are not well planned, the LOS of the intended improvement can be severely diminished due to unanticipated development. The following is a summary of all related planning documents.

### Existing Local, State, and Regional Plans

#### **Local Plans**

The following plans and studies provide background, history, policy direction, and/or support for the modified access proposal at NE 134<sup>th</sup> Street.

- *Clark County Comprehensive Growth Management Plan (1994)*: This project must be consistent with several elements of the Comprehensive Growth Management plan, including: Transportation (e.g., roads, functional classifications, other transportation facilities), Land Use (e.g., urban growth boundaries, comprehensive plan designations, zoning), Economic Development (e.g., types of development, accommodating future growth); and Capital Facilities (e.g., supporting the capital facilities identified in the Comprehensive Plan; consistency with funding projections). The preferred operational alternative reflects the land use characteristics of the Land Use element of the Comprehensive Plan. This plan is currently being updated and the results of the access decision study are being addressed in the plan update.
- *Comprehensive Plan Consistency Determination*: Clark County has determined that the preferred operational alternative is consistent with the Comprehensive Plan.
- *Clark County's Salmon Creek/Fairgrounds Regional Road Plan (SCFGRRP - 1997)*: The need for revised access was first studied in this plan, and a focal point of the study was NE 134<sup>th</sup> Street. The study focused on the weekday PM peak hour, and the horizon

year was 2017. The SCFGRRP determined that the following improvements would achieve congestion relief and result in a LOS D for Year 2017 along NE 134<sup>th</sup> Street: 1) a reduction in the number of traffic signals on NE 134<sup>th</sup> Street between NE 10<sup>th</sup> Avenue and the I-205/NE 134<sup>th</sup> Street interchange; 2) modifications to the NE 134<sup>th</sup> Street/I-5/I-205 interchange complex, and 3) a new local crossing of I-5 along NE 154<sup>th</sup> Street between NE 10<sup>th</sup> Avenue and NE 20<sup>th</sup> Avenue.

- **Transportation Improvement Programs:** Portions of interchange-area improvements (e.g., Highway 99 realignment) are identified in Clark County's 2001-2006 Transportation Improvement Program (TIP). Planning for the NE 134<sup>th</sup> Street interchange modification is also included in the 2001-2006 Statewide Transportation Improvement Program. Construction of interchange improvements, ramp modifications, relocation of the Salmon Creek Park-and-Ride, new crossings of I-5 at NE 139<sup>th</sup> Street and NE 154<sup>th</sup> Street, and HOV-only ramps from I-5 to NE 139<sup>th</sup> Street have not yet been added to local and/or state TIPs.

### **Regional Plans**

- **State Air Quality Implementation Plan (SIP) for Clark County:** this plan demonstrates how Clark County will maintain its compliance with air quality standards. The proposed NE 134<sup>th</sup> Street interchange improvements, with the exception of the NE 139<sup>th</sup> Street crossing, are contained in the transportation network that was modeled under air quality regulations in order to ensure conformity with air quality standards. This will be evaluated during the environmental review stage of the project.
- **Metropolitan Transportation Plan (MTP):** the Southwest Washington Regional Transportation Council (RTC) maintains this plan, which serves as the long-range transportation plan for the regional transportation system. Improvements to the I-5 corridor, including the NE 134<sup>th</sup> Street interchange, are identified as one of the highest regional funding priorities for the MTP. FHWA and EPA have determined that this plan meets applicable air quality conformity regulations.
- **Regional Transportation Council Board Approval:** the RTC Board, at their January 2002 meeting, adopted a resolution in support of this access modification request.

### **State Plans**

- **Washington State Growth Management Act (GMA):** the Washington State Office of Financial Management (OFM) is responsible for developing planning-horizon year projections of population and employment used for traffic projections. The county-wide totals of projected population and employment are to be used for local and regional planning in Clark County. Allocations to urban growth areas (UGAs) and traffic analysis zones (TAZs) are the responsibility of Clark County as the lead agency, with support from the cities within Clark County and the Southwest Washington Regional Transportation Council (RTC). Improvements to the NE 134<sup>th</sup> Street interchange are included in the transportation element of the Clark County Comprehensive Plan, with the exception of the NE 139<sup>th</sup> Street crossing of I-5, which would require a Comprehensive Plan amendment.
- **I-5/I-205 North Corridor Study (January 2001):** this study recommended an interchange similar to the proposed design and provided the basis for this report.



- *State Highway System Plan (HSP)*: the 1999-2018 HSP identified improvements to the NE 134<sup>th</sup> Street interchange. The draft 2001-2020 HSP incorporates the recommendations of the I-5/I-205 North Corridor Study.

### **Consistency with Established Plans**

This section demonstrates how existing plans were considered in developing the modified access project at the NE 134<sup>th</sup> Street interchange.

#### ***Urban Growth Area Established***

The urban growth area (UGA) was established as part of the adoption of the Comprehensive Growth Management Plan in 1994. The Vancouver urban growth area includes this interchange. The proposed modified access to the NE 134<sup>th</sup> Street interchange is included in the UGA.

#### ***Land Use/Zoning***

The NE 134<sup>th</sup> Street interchange is fully contained within the Vancouver urban growth area. The comprehensive plan anticipates interchange improvements, including the proposed modified access. Thus, the land use impacts of the interchange improvements are consistent with the comprehensive plan.

#### ***Post-2025 Growth***

With full implementation of the preferred operational alternative, the interchange will have the capacity to accommodate the projected 20-year economic and traffic growth that this interchange will serve. Two ramps – the northbound I-205 off-ramp to NE 20<sup>th</sup> Avenue and the northbound NE 20<sup>th</sup> Avenue-to-southbound I-205 “slip ramp” – provide a significant amount of post-2025 capacity, and this interchange is projected to be able to accommodate traffic growth beyond the Year 2025.

#### ***Outstanding Consistency Issue***

Interchange access modifications are consistent with the Clark County Comprehensive Growth Management Plan, the Metropolitan Transportation Plan, and the Highway System Plan. However, the NE 139<sup>th</sup> Street crossing, recommended as a local improvement to relieve the NE 134<sup>th</sup> Street corridor, is not currently contained in the comprehensive plan, nor is it contained in the County’s Arterial Atlas. This crossing is a necessary component in order for the preferred operational alternative to properly function. It would need to be included through a comprehensive plan amendment process. Statements from Clark County staff indicate that the NE 139<sup>th</sup> Street crossing could be added to the Comprehensive Plan if a dedicated funding source is identified for this improvement.

#### ***Transit/Transportation System Management Strategies Explored***

The NE 134<sup>th</sup> Street Modified Access study examined transit and transportation system management (TSM) alternatives at this interchange. Transit options included relocating and expanding the Salmon Creek Park-and-Ride, adding HOV lanes on I-5, adding HOV-only ramps between I-5 and a proposed new NE 139<sup>th</sup> Street crossing. TSM options included additional turn-lanes on the existing ramps and traffic signal coordination. WSDOT plans to extend the southbound HOV lane north to NE 134<sup>th</sup> Street as part of a programmed widening project

between NE 99<sup>th</sup> and NE 134<sup>th</sup> Street on I-5. A northbound HOV lane will be incorporated in the design, which will be implemented along the northbound I-5 corridor between the Interstate Bridge and NE 134<sup>th</sup> Street when congestion levels on I-5 warrant or when additional capacity is provided across the Interstate Bridge to alleviate a bottleneck at that location. Neither the transit nor the TSM alternatives were able to fully meet the project's Purpose and Need requirements, specifically the queues that will extend onto the I-5 and I-205 mainlines in 2025. A TSM element is included in the preferred operational alternative and augments the project.

### Policy Point Two Conclusions

The proposed access modification for the NE 134<sup>th</sup> Street interchange is consistent with adopted local, regional, and state plans. Analysis for the preferred operational alternative was conducted using land use forecasts supplied by the local planning agencies. This interchange is fully contained within the UGA and is not expected to result in a modification of the UGA or spur any inconsistent land use changes.

Local plans include the *Clark County Comprehensive Growth Management Plan* and the *Arterial Atlas*, which is a component of the Comprehensive Plan that serves as the local arterial plan. The NE 134<sup>th</sup> Street interchange modification is included in the *Arterial Atlas*. It is located within the Vancouver Urban Growth Area and, as such, is included in the Transportation and Land Use elements of the Comprehensive Plan and will not encourage growth that is inconsistent with the Comprehensive Plan.

The NE 134<sup>th</sup> Street interchange is included in the regional *Metropolitan Transportation Plan* (MTP), which identifies it as a priority project for improvements. It is also included in the air quality conformity analysis for the MTP, which was conducted as part of the State Air Quality Implementation Plan (SIP) for Clark County air quality analysis requirements.

Statewide plans include the *Washington Transportation Plan* (WTP) and the *Highway System Plan* (HSP). The NE 134<sup>th</sup> Street interchange improvements are included in the HSP, which is an element of the WTP. The WTP is currently under development.

## POLICY POINT THREE: REASONABLE ALTERNATIVES

*WSDOT DM1425 Policy: Have all reasonable alternatives been assessed and provided for?*

The Access Decision process requires the examination of reasonable local improvement alternatives, in lieu of new or modified access to the interstate system. This analysis must demonstrate that existing interchanges and/or local roads and streets can neither “provide the necessary access nor be improved to satisfactorily accommodate the design-year traffic demands while at the same time providing the access intended by the proposal” (FHWA guidance, Federal Register, 1998). Also required is an evaluation to ensure that transportation system management strategies (e.g., ramp metering, mass transit, and HOV facilities) have been assessed and included in the alternatives, if currently justified, or could be accommodated if a future need is identified.

A variety of alternatives were developed and analyzed in order to respond to the issues identified in the project’s problem statement. Specifically, the goal of these alternatives is to improve regional mobility to and from central and west Clark County and alleviate future ramp queues and congestion at existing 134<sup>th</sup> Street interchanges with I-5 and with I-205. Alternatives were originally developed during the I-5/I-205 North Corridor Study and several were carried forward into this study. Additionally, two workshops were held with agency staff represented on the Steering Committee for this access decision study to develop and review the analysis of additional local improvement alternatives as well as alternatives for modified access.

LOS and ramp queue lengths are the measures of effectiveness discussed in this section.

**Table 1** on page 31 summarizes existing (1999), short-term (2005), and long-term (2025) LOS for sections of I-5 and I-205 in the study area under no-build and various improvement alternatives. It also summarizes northbound off-ramp queue lengths for the existing I-5 and I-205 ramps. A more detailed description of the operational analysis is included in Policy Point 6 of this report.

Several local system improvement alternatives (in lieu of modified access) were developed and analyzed. These are graphically portrayed in **Figure 5**. These included:

- Improving the Existing Interchange: widening existing ramps and adding turn-lanes at the ramp termini;
- Transit improvements (new Park-and-Ride, high level of bus service) and Transportation System Management improvements (e.g., intersection improvements and traffic signal coordination).
- Local System Improvements: widening of NE 134<sup>th</sup> Street from four travel lanes to six, new crossings of I-5 at NE 139<sup>th</sup> Street and NE 154<sup>th</sup> Street, widening NE 72<sup>nd</sup> Avenue between NE 119<sup>th</sup> Street and NE 219<sup>th</sup> Street to five lanes, widening NW 11<sup>th</sup> Avenue between NW 139<sup>th</sup> Street and NW 199<sup>th</sup> Street to three lanes and extending it across Whipple Creek, extending a collector roadway from NE 134<sup>th</sup> Street at the I-205 northbound off-ramp terminus to NE 139<sup>th</sup> Street, and relocating the Salmon Creek Park-and-Ride to a site west of I-5 along NE 139<sup>th</sup> Street.



**Figure 5. 134<sup>th</sup> Street Interchange Local Improvement Alternatives**



**Appendix B** contains the technical memorandum that discusses the complete details of the alternatives analysis. This discussion is summarized below.

The conclusions reached from the local improvement alternatives analysis follow:

- Two new crossings of I-5 are necessary in order to remove a significant number of local east-west trips across I-5 from the interchange area. However, this alone still does not eliminate projected ramp queuing onto the mainline, as Year 2025 peak period queues are projected to extend 1200 feet onto the I-205 mainline and continue to extend past the 99<sup>th</sup> Street interchange on I-5. Both crossings are necessary components of the preferred operational alternative.
- Traffic operations improvements are also necessary on NE 134<sup>th</sup> Street, to alleviate the ramp queuing issue. These improvements include improving traffic signal coordination, removing traffic signals where possible, and reducing the amount of traffic using the NE 20<sup>th</sup> Avenue/NE 134<sup>th</sup> Street intersection by constructing local improvements and also examining potential modified access alternatives such as a northbound I-205 off-ramp directly to NE 20<sup>th</sup> Avenue (northbound) north of 134<sup>th</sup> Street.
- Although new crossings reduce the amount of traffic at the NE 20<sup>th</sup> Avenue/NE 134<sup>th</sup> Street intersection, this reduction is not sufficient to alleviate the ramp queuing issue.
- The only alternatives that reduce the traffic at the NE 20<sup>th</sup> Avenue/NE 134<sup>th</sup> Street intersection are modified-access scenarios. These include the flyover ramp to southbound I-205 and the northbound-20<sup>th</sup> Avenue-to-southbound-I-205 right turn and ramp, which encourage ramp trips to use other routes to access and exit I-5 and I-205.

The following section discusses the existing and future conditions of the study corridor and the various alternatives analyzed, including the no-build, local improvements, improvements to the existing interchange, and the preferred operational alternative.

### Existing Conditions

The section of I-5 at NE 134<sup>th</sup> Street north to the I-205 junction has been designated a High Accident Corridor in the WSDOT 1999-2018 Highway System Plan, due to a high accident rate attributable to ramp queues at the NE 134<sup>th</sup> Street northbound off-ramp and a high amount of weaving traffic on I-5 between I-205 and NE 179<sup>th</sup> Street.

The NE 134<sup>th</sup> Street interchange is operating at a near capacity LOS. NE 134<sup>th</sup> Street intersections with Highway 99 and NE 20<sup>th</sup> Avenue are at capacity, however the close proximity of these two signalized intersections and the close proximity to other signalized intersections and the Salmon Creek Park-and-Ride result in significant spillback through adjacent intersections.

The section of I-5 between NE 134<sup>th</sup> Street/I-205 and NE 179<sup>th</sup> Street operates at approximately LOS C in the AM peak (southbound) and LOS D in the PM peak (northbound). South of NE 134<sup>th</sup> Street, I-5 operates at approximately LOS C in the PM peak hour northbound.

The section of I-5 between NE 134<sup>th</sup> Street and near the NE 179<sup>th</sup> Street interchange is a High Accident Corridor. At the NE 134<sup>th</sup> Street interchange, the high accident condition is due to the frequent recurrence of vehicles queued down the northbound off-ramp onto the I-5 mainline (primary accident type is rear-end). The section of the corridor between I-205 and NE 179<sup>th</sup>

Street experiences predominantly sideswipe and rear-end accidents, attributable to vehicles changing lanes within the 6000 ft. weaving section to enter or exit I-5 at NE 179<sup>th</sup> Street and at I-205 (see **Figure 6**).

### Short-Term Outlook

Based on the 2005 travel forecasts, it is likely that future increases in traffic volume will cause the I-5 sections between I-205 and NE 179<sup>th</sup> Street and south of NE 134<sup>th</sup> Street to become deficient (falling below congestion standards) within eight to ten years (see **Table 1**) without interchange improvements. At this point, the corridor would be operating at LOS E & F conditions, and as the traffic using NE 134<sup>th</sup> Street interchange and the NE 134<sup>th</sup>/NE 139<sup>th</sup> Street corridors continues to grow, the congestion levels and ramp queues at the NE 134<sup>th</sup> Street interchange will also continue to grow.

As congestion increases on NE 134<sup>th</sup> Street, the close intersection spacing will result in significant spillbacks through adjacent intersections. This will cause additional ramp queuing for both the I-5 and I-205 northbound off-ramps, which will result in these queues extending onto the mainline. This will affect mainline traffic operations and is expected to exacerbate the high accident condition on I-5 and increase the accident risk on I-205.

### Long-Term Outlook

Under any of the alternatives which do not modify access, during the PM peak period, NE 134<sup>th</sup> Street will experience increased congestion and queue spillbacks, which in turn will result in ramp queues extending onto the I-5 and I-205 mainlines. In fact, by the Year 2025, PM peak period queues at the northbound 134<sup>th</sup> Street off-ramps are expected to extend one mile along the northbound I-205 mainline and past the NE 99<sup>th</sup> Street interchange (two miles south of NE 134<sup>th</sup> Street) on the northbound I-5 mainline. The extent of the congestion indicates that ramp queuing will occur for a time period that exceeds the one-hour PM peak (perhaps up to two hours,) per weekday in 2025.

The analysis indicated that even with two new crossings of I-5 (NE 139<sup>th</sup> Street and NE 154<sup>th</sup> Street), congestion levels on NE 134<sup>th</sup> Street under existing ramp configurations will continue to result in ramp queues that spill onto the I-5 and I-205 mainlines by 2025 without interchange modifications.

**Figure 7** shows the current, and long-term (2025) LOS on I-5 and I-205 adjacent to the 134<sup>th</sup> Street interchange.



**Table 1. Existing and Projected PM Peak Hour LOS and Queuing on I-5 and I-205**

		2005		2025		
Segment	1998	No-Build <sup>1</sup>	Preferred Alternative	No-Build <sup>1</sup>	Local Alternatives	Preferred Alternative
I-5						
NE 134 <sup>th</sup> Street northbound off-ramp queue (ft.)	600	1,000	300	1,000	1,000	500
Mainline queue prior to 134 <sup>th</sup> Street off-ramp gore (ft.)	None	400	None	10,000+	10,000+	None
99 <sup>th</sup> Street on-ramp merge	C	C	C+	D	D	D+
Mainline, 99 <sup>th</sup> St to 134 <sup>th</sup> St.	C	E	D	C	C	C+
NB diverge at 134 <sup>th</sup> off-ramp	B	C	C+	C	C	C*
Mainline, 134 <sup>th</sup> to I-205	C	D	D	E	E	F
I-5/I-205 Merge	D	F	F	F	F	F
Mainline, I-205/I-5 Merge to 179 <sup>th</sup>	D	F	D	E	E	D
NB diverge at 179 <sup>th</sup>	C	C	C	C	C	C
I-205						
NE 134 <sup>th</sup> Street northbound off-ramp queue (ft.)	200	1,050	200	1,050	1,050	400
Mainline queue prior to 134 <sup>th</sup> Street off-ramp gore (ft.)	None	200	None	5,400	1,200	None
83 <sup>rd</sup> St. on-ramp merge	C	C	C	F	F	F
Mainline, 83 <sup>rd</sup> to 134 <sup>th</sup> St.	B	C	C	C	C	C+
NB diverge at 134 <sup>th</sup>	B	B	B	C	C	C+
I-205 mainline, 134 <sup>th</sup> to I-205	B	B	B	D	D	C
Ramp Merge: 134 <sup>th</sup> on-ramp						
NB Merge at 134 <sup>th</sup> on-ramp <sup>2</sup>	B	B	C	E	E	F**

**Bold Italic** indicates that the estimated queue exceeds the ramp storage length or queuing occurs on the mainline.

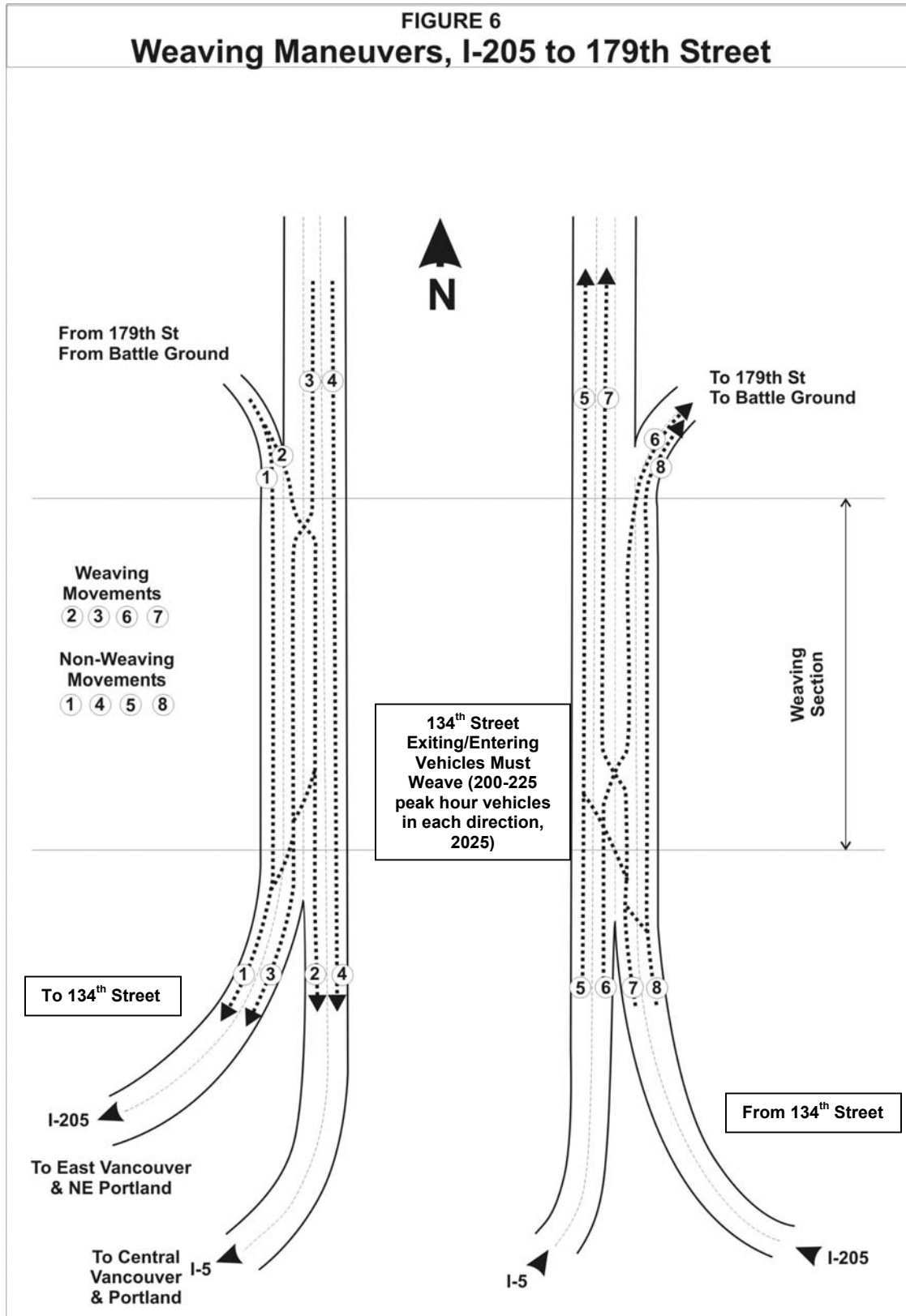
\* LOS is the result of applying the Highway Capacity Manual. As described in Chapter Six of this report, traffic simulation output is the preferred method to evaluate these alternatives. Traffic simulations indicate that the preferred operational alternative provides an improvement over the no-build and local improvement alternatives in these sections.

\*\* Could potentially be mitigated with implementation of a northbound on-ramp ramp meter.

<sup>1</sup> 2005 and 2025 No-Build networks assume I-5 widening from 99<sup>th</sup> Street to 134<sup>th</sup> Street and an auxiliary lane on I-205 between 83<sup>rd</sup> Street and 134<sup>th</sup> Street. LOS is the result of applying HCM.

<sup>2</sup> Ramp merges onto I-205 in the No-Build and Local Improvement alternatives, and onto I-5 in the Preferred Alternative.

Figure 6. How 134<sup>th</sup> Street Interchange Affects Weaving On I-5



**Figure 7. Existing and Future No-Build Level of Service**



## **Alternatives Analysis**

The following alternatives were analyzed and evaluated. Alternatives were tested in various combinations of interchange improvements and local system improvements with no access modifications to the NE 134<sup>th</sup> Street interchange. Access modification alternatives were also tested. Analysis summaries and conclusions are included with each alternative. **Table 2** on page 37 summarizes the evaluation. For the purposes of the analysis, ramp metering was assumed to be in effect under all of the alternatives.

The constraining intersection is NE 20<sup>th</sup> Avenue at NE 134<sup>th</sup> Street. This intersection is forecast to operate at LOS E/F under all scenarios except the preferred operational alternative. The “bottleneck” created by this intersection results in queue spillbacks in both directions on NE 134<sup>th</sup> Street, which in turn limits the ability to clear ramp queues from the northbound off-ramps in the PM peak. Thus, in order to satisfy the project’s purpose and need and alleviate ramp queuing issues, alternatives to consider must further reduce the number of vehicles entering this intersection in the 2025 PM peak period.

Widening the existing northbound off-ramps and southbound on-ramps provides some additional storage. However, the close spacing and number of traffic signals continues to result in ramp queues that extend onto the I-5 and I-205 mainlines. Traffic simulations completed for the Year 2025 indicate that there is a high potential for queues to extend onto the I-205 mainline on the southbound off-ramp.

## **No Action Alternative**

The no action alternative consists of the existing network and programmed projects in the study area. Included were a new north-south collector (Union Road/17<sup>th</sup> Avenue) between 134<sup>th</sup> and 179<sup>th</sup> Streets, and 179<sup>th</sup> Street widening from NW 11<sup>th</sup> Avenue to NE 19<sup>th</sup> Avenue. Also included was widening of I-5 to six lanes plus HOV lanes between NE 99<sup>th</sup> Street and NE 134<sup>th</sup> Street and the Highway 99 realignment between NE 129<sup>th</sup> Street to NE 139<sup>th</sup> Street.

## **Improving Existing Interchanges**

The examination of existing interchange improvements included widening existing ramps at the NE 134<sup>th</sup> Street interchange, adding turn lanes at the ramp termini, making transit improvements (e.g., relocated Park-and-Rides, high level of bus service), and making TSM/Safety/ITS improvements (e.g., intersection improvements, traffic signal coordination, variable message signs).

Based on comparisons to the No-Build alternative, the conclusions reached on the “Improving Existing interchanges” alternative are:

- They do not alleviate current and future mobility and safety deficiencies at the NE 134<sup>th</sup> Street interchanges along I-5 and I-205, because ramp queues are projected to continue to extend onto the mainline.
- They do not improve mobility deficiencies on NE 134<sup>th</sup> Street for regional trips to and from central and west Clark County.

- They do not reduce trips on I-5 or reduce traffic weaving in the critical section of I-5 between I-205 and NE 179<sup>th</sup> Street. The preferred operational alternative is the only alternative that reduces weaving in this section of I-5.
- As there continue to be large delays for interchange traffic, they do little to improve transit and freight mobility on I-5 or I-205.

### **Local Improvements**

These alternatives include tests of new crossings of I-5 at NE 139<sup>th</sup> Street and NE 154<sup>th</sup> Street, a two-way collector extension of the I-205 northbound off-ramp from 134<sup>th</sup> Street to 139<sup>th</sup> Street, and other arterial improvements on NW 11<sup>th</sup> Avenue, NE/NW 179<sup>th</sup> Street, and NE 72<sup>nd</sup> Avenue. Conclusions reached on the “Local Improvements” alternatives are:

- Some of the local improvements exacerbate current and future deficiencies on I-5 and on I-205 at the NE 134<sup>th</sup> Street interchange by attracting approximately two percent more travelers to this interchange, worsening the ramp queuing problems on both mainlines.
- These alternatives will not alleviate projected LOS deficiencies and current and future high accident rates on I-5 and I-205.
- They do not resolve the issue of the ramp to southbound I-205 being in very close proximity to the NE 134<sup>th</sup> Street/NE 20<sup>th</sup> Avenue intersection.
- Local improvement alternatives do not reduce trips on I-5 or reduce traffic weaving in the critical section of I-5 between I-205 and NE 179<sup>th</sup> Street.
- This alternative does little to improve freight or transit mobility on I-5 or I-205 in the interchange vicinity.

### **Modified NE 134<sup>th</sup> Street Interchange (Preferred Operational Alternative)**

This alternative would include relocating the I-5 southbound off-ramp and adding a northbound on-ramp (and removing the existing ramps) to the I-5/NE 134<sup>th</sup> Street interchange (resulting in a full diamond interchange at that location). It would involve constructing new crossings of I-5 along NE 139<sup>th</sup> Street and NE 154<sup>th</sup> Street, and relocating the Salmon Creek Park-and-Ride to a site along NE 139<sup>th</sup> Street west of I-5, providing for direct-access HOV-only ramps between the I-5 HOV lanes and the NE 139<sup>th</sup> Street crossing. A new flyover ramp would be provided from NE 134<sup>th</sup> Street to I-205 southbound, located at the current northbound I-205/NE 134<sup>th</sup> Street intersection. Access from the existing ramp onto southbound I-205 would be modified to accommodate the flyover and for an exclusive ramp turn from northbound NE 20<sup>th</sup> Avenue onto southbound I-205 would be added. A new northbound off ramp from I-205 to northbound NE 20<sup>th</sup> Avenue is also included. Please refer to **Figure 2** for an illustration of the preferred alternative.

Conclusions reached on the “Modified NE 134<sup>th</sup> Street interchange” (the preferred operational alternative) alternative are:

- It is the only alternative that fully alleviates the ramp queuing problem for the I-5 and I-205 northbound off-ramps to NE 134<sup>th</sup> Street.

- The modified NE 134<sup>th</sup> Street interchange is the only alternative that helps alleviate the short- and long-term congestion and accident problems on the I-5 section between NE 179<sup>th</sup> Street and I-205, by reducing the weaving/lane-changing occurring in that section.
- It provides improvements for regional trips using NE 134<sup>th</sup> Street.
- The relocation of the southbound on-ramp to I-205 away from the NE 134<sup>th</sup> Street/ NE 20<sup>th</sup> Avenue intersection vicinity resolves the short maneuvering distance issue at that ramp on NE 134<sup>th</sup> Street.
- It significantly improves mobility for transit and freight. The HOV improvements provide for a greater incentive to carpool or take transit, which increases the potential for mainline improvements by removing single-occupancy vehicles from the interstates.

**Table 2. Evaluation Summary**

Measure	No-Build	Local Improvements	Improve Existing Interchange	Preferred Operational Alternative+
<b>Interstate Impacts</b>				
- I-205 South of I-5	○	●	●	●
- I-5 South of I-205	○	●	●	●
- I-5 from I-205 to NE 179 <sup>th</sup>	○	○	○	●
<b>Mobility on NE 134<sup>th</sup> Street</b>	○	●	●	●
<b>Accidents on I-5</b>	○	○	●	●
<b>Accidents on I-205</b>	○	○	●	●
<b>Freight Mobility</b>	○	●	●	●
<b>Transit/HOV Mobility</b>	○	●	●	●
<b>Impacts to Adjacent Interchanges</b>				
- NE 179 <sup>th</sup> Street	○	○	●	●
- NE 99 <sup>th</sup> Street	○	○	●	●
<b>Benefit/Cost</b>	N/A	●	●	●
<b>Close spacing of I-205 ramp to NE 134<sup>th</sup>/NE 20<sup>th</sup> intersection</b>	○	○	○	●
<b>Wetlands Impacts</b>	N/A	○	●	○

+Modified access at 134<sup>th</sup> interchange; 139<sup>th</sup> and 154<sup>th</sup> crossings; relocated P&R; HOV ramps.

○ Negative impact or disbenefit

● Minor benefit

● Significant positive impact or benefit

Note: Table summarizes the conclusions of the steering committee. For a detailed summary see Table B-2 in Appendix B.

### Policy Point Three Conclusions: Alternatives

The modified access alternative (the preferred operational alternative) is the only alternative that satisfies the project's purpose and need.

None of the improvement alternatives which did not modify access benefited I-5 or I-205 mainline traffic. They do not alleviate the short- and long-term ramp queuing issues at NE 134<sup>th</sup> Street. They had little or no effect on weaving traffic in the critical section between I-205 and 179<sup>th</sup> Street. The options that improved the NE 134<sup>th</sup> Street interchange without access modifications encouraged more traffic use, which in turn exacerbates the ramp queuing problems.

All of the reasonable alternatives which did not modify access at the interchange were eliminated because they did not meet the purpose and need of the project. Specific conclusions follow:

- The alternatives which did not modify access do not improve the current and future ramp queuing situation on the I-5 and I-205 northbound off-ramps.
- They do not resolve the close spacing of the 134<sup>th</sup> Street / 20<sup>th</sup> Avenue intersection with the I-205 southbound on-ramp.
- They do not provide the level of congestion relief on NE 134<sup>th</sup> Street that the access modification alternatives provide.

They do not improve safety and mobility deficiencies on I-5 between NE 179<sup>th</sup> Street and I-205 (nor on other sections of I-5). The preferred operational alternative is the only alternative that reduces the amount of lane-changing occurring in that section of I-5.

Improvements to the existing ramps at the NE 134<sup>th</sup> Street interchange do not significantly improve mobility for transit and carpool trips that travel on the I-5 HOV lanes and access the Salmon Creek Park-and-Ride.



## **POLICY POINT FOUR: NEED FOR ACCESS POINT REVISION**

*DM1425 Policy: What are the current and projected needs and why won't the existing access points and existing and/or improved local system meet the needs? Is the anticipated demand short or long trip?*

This policy point examines the purpose and need of the proposed access point revision. This policy point requires demonstration that the existing interchanges and/or local roads and streets in the corridor can neither provide the necessary access nor be improved to satisfactorily accommodate the design-year traffic demands while at the same time providing the access intended by the proposal. Additionally, it must also be demonstrated that the demand being met with the proposed access modification is for primarily regional (long) trips.

The proposed action was developed in response to current and projected traffic congestion at the NE 134<sup>th</sup> Street interchange with I-5 and I-205. The proposed action will serve to protect and improve the mainline system and specifically responds to the following issues:

- The current (and projected future) high accident rate at the NE 134<sup>th</sup> Street interchange, due to ramp queues extending onto the I-5 mainline.
- The potential for future queues to extend onto the I-205 mainline from the northbound off-ramp.
- The close proximity of signals and high traffic volumes projected for NE 134<sup>th</sup> Street, a local arterial. This will significantly increase delays and queues for east-west arterial traffic, and affect the ability to clear traffic from the I-5 and I-205 northbound off-ramps.
- Capacity constraints, traffic impacts, and high delays to buses and HOVs at the Salmon Creek Park-and-Ride, which is located in close proximity to and between the I-5 and I-205 interchanges. This will affect transit and rideshare users, and in turn will not encourage the reduction of mainline vehicular trips.

The primary purpose of this modified access project is to alleviate current and future congestion and accident problems on the I-5 and I-205 mainlines by improving the interchange and modifying access to and from the I-5 and I-205 mainlines. Its purpose is also to alleviate current and future safety and mobility deficiencies at the interchange. This would be accomplished by providing new crossings of I-5 at NE 139<sup>th</sup> Street and NE 154<sup>th</sup> Street, modifying access points along I-5 and I-205, relocating the Salmon Creek Park-and-Ride to a site west of I-5 with access to NE 139<sup>th</sup> Street, adding new ramps to and from northbound I-205 connecting with NE 20<sup>th</sup> Avenue, and providing direct HOV access to and from NE 139<sup>th</sup> Street near the relocated Park-and-Ride.

This project's objectives are to:

- Maintain or improve the integrity of traffic operations and safety on the I-5 and I-205 mainlines near the NE 134<sup>th</sup> Street interchange;
- Reduce the negative impacts of delay on HOVs and buses;
- Improve traffic operations for regional trips on NE 134<sup>th</sup> Street; and
- Improve regional mobility between central and west Clark County and the rest of the region.

## Analysis

Alternatives that maintain the existing interchange configuration will likely experience queuing onto the mainlines of both facilities, as near-gridlock conditions on NE 134<sup>th</sup> Street will prevent the ramp queues from clearing. As queues extend further onto the mainline, traffic operations will be negatively impacted on I-5 and I-205. Additionally, with stopped traffic occurring on the mainline in and next to normally moving traffic lanes, rear-end and lane-changing accidents will continue to increase. This will exacerbate the current high-accident situation on I-5 and increase the risk of I-205 becoming a High Accident location.

The section of I-5 between I-205 and NE 179<sup>th</sup> Street is also critical. It is part of the High Accident Corridor designated in the 1999-2018 Highway System Plan. Accidents and congestion in this area are attributable to a high number of lane-changing maneuvers in this short section of Interstate (6,000 feet). Vehicles entering southbound from NE 179<sup>th</sup> Street must weave across at least two lanes of freeway to continue south on I-5, and vehicles exiting southbound at NE 134<sup>th</sup> Street must use the right freeway lane and mix with traffic entering from NE 179<sup>th</sup> Street. This results in the high amount of lane changing. A similar situation occurs northbound, as traffic entering the freeway from NE 134<sup>th</sup> Street must merge with I-205 and then weave across at least one lane of I-205 to continue northbound on I-5 north of NE 179<sup>th</sup> Street. This traffic mixes with traffic exiting at NE 179<sup>th</sup> Street.

**Figures 3 and 4** in the Executive Summary of this report showed the trip make-up of the I-5 and I-205 ramps in the Year 2025. This analysis, based on demand modeling using regional land use forecasts, demonstrated that the NE 134<sup>th</sup> Street interchange serves primarily regional trips.

Based on the 2005 and 2025 travel forecasts, future increases in traffic volume are expected to cause this I-5 section to become deficient (falling below congestion standards) within eight to ten years. At this time, the corridor is forecast to be operating at LOS E conditions within approximately ten years, and as NE 134<sup>th</sup> Street ramp traffic and I-5 traffic continue to grow, the number of lane-change maneuvers in this critical I-205-to NE 179<sup>th</sup> Street section will increase. Additionally, increased congestion and weaving along I-5 will likely result in a higher number of accidents in this area.

Evaluation of the alternatives is summarized in Policy Point Three. Alternatives which improved the existing interchange ramps and provided local system improvements did not fully resolve the issues identified in the problem statement, primarily ramp queues extending onto the I-5 and I-205 mainlines and accident problems associated with those queues.

A modified access alternative at the NE 134<sup>th</sup> Street interchange was proposed to help alleviate the accident and congestion issues in this section of I-5. By relocating the southbound off- and northbound on-ramps to I-5 rather than I-205, the amount of lane changing in the I-5 section between I-205 and NE 179<sup>th</sup> Street should be reduced, alleviating the congestion and accident problem.

**Appendix C** contains the travel forecasting technical memorandum.

### Policy Point Four Conclusions: Need

Improving the existing interchange and providing local system improvements alone cannot resolve the queuing and safety issues identified in the problem statement. The interstate access modifications, along with the local improvements that are part of the preferred operational alternative are needed to adequately maintain interstate mainline operations and safety and arterial mobility for regional trips using I-5 and I-205.

## POLICY POINT FIVE: ACCESS CONNECTIONS AND DESIGN

### Background

*DM1425 Policy: Will the proposal provide fully directional interchanges connected to public roads, spaces appropriately, and designed to full design level geometric control criteria?*

The guidance for Policy Point Five of the Access Decision Report is to show that the proposal will provide fully directional interchanges connected to public roads, spaced appropriately, and designed to full design level geometric control criteria which meet or exceed full Interstate standards. The intent is to provide for fully-directional interchanges which connect with public roads, with certain exceptions being considered, such as for HOV ramps. The information must be presented in sufficient detail to show that the proposed access can be constructed to full interstate standards.

This chapter discusses the proposed modifications and revised accesses presented in the preferred operational alternative. Interchange spacing, ramp configuration, weave distances, and traffic projections are identified in sufficient detail to allow an operational review of each of the build options necessary to maintain an acceptable LOS over the 20-year design period.

**Appendix D** of this report contains a detailed technical memorandum of the design process and findings for the various alternatives. The section below describes the design process for the preferred operational alternative. **Figure 2** in the Executive Summary depicts a conceptual design of the preferred operational alternative.

The design analysis concluded that the proposed access can be constructed to full Interstate standards as described in the WSDOT Highway Design Manual and the AASHTO Policy on Geometric Design of Highways and Streets. The preferred operational alternative provides for a fully-directional interchange at NE 134<sup>th</sup> Street. An exception to the fully-directional policy is requested for the HOV-only ramps, which are intended to connect to HOV lanes on I-5 south of NE 134<sup>th</sup> Street.

### Preferred Operational Alternative

The Preferred Operational Alternative consists of a full diamond interchange with NE 134<sup>th</sup> Street on I-5. A flyover from NE 134<sup>th</sup> Street to I-205 southbound is included, as are overpasses on both NE 139<sup>th</sup> Street and NE 154<sup>th</sup> Street. This option also adds HOV drop ramps connecting planned I-5 HOV lanes south of the interchange to the NE 139<sup>th</sup> Street overpass. The Park-and-Ride facility is relocated to an area west of I-5 and immediately south of NE 139<sup>th</sup> Street. A ramp is extended to northbound NE 20<sup>th</sup> Avenue from the I-205 to NE 134<sup>th</sup> Street northbound off-ramp. This option also adds an exclusive right-turn lane to connect northbound NE 20<sup>th</sup> Avenue to I-205 southbound. In the interim, the northbound off ramp to NE 139<sup>th</sup> Street will be restricted to buses only.

### Design Standards

Conceptual design was completed using the Washington Department of Transportation (WSDOT) Highway Design Manual. This manual comprehensively discusses highway design elements including design speed, highway and ramp cross-sections, acceleration and

deceleration distances for on-ramps and off-ramps, interchange spacing, and roadway alignment. Preliminary designs were completed using the “Full Design Level” standards found in Chapter 4 of this design manual. Design for off-system improvements complies with the AASHTO “Green Book.”

All elements presented are in compliance with the design standards described above. No exceptions are required.

### ***Interchange Improvements (Preferred Operational Alternative)***

The following are interchange improvement components of the preferred operational alternative:

#### **NE 134<sup>th</sup> Street Full Diamond at I-5**

This design provides a new northbound access ramp to I-5. The ramp is aligned with the existing I-5 to NE 134<sup>th</sup> Street northbound off-ramp. It replaces the existing access location and moves the access to I-5 rather than on I-205.

This design also provides a new southbound I-5 access to NE 134<sup>th</sup> Street. The ramp diverges from I-5 with a standard taper and meets NE 134<sup>th</sup> Street at the existing intersection with the southbound on-ramp. A local connection with NE 136<sup>th</sup> Street can be incorporated, which would provide local access and access to the relocated Park-and-Ride. The ramp would replace the existing southbound access point. This ramp, in conjunction with the northbound ramp described above, completes the full diamond interchange at NE 134<sup>th</sup> Street and I-5.

Access at this interchange will continue to be fully directional.

#### **HOV Direct Access Ramps to NE 139<sup>th</sup> Street Overpass**

As part of the original I-5 North Access study, there was strong desire to provide priority access for HOV lanes. This design, which has been successfully used in other states and is included in the WSDOT HOV Direct Access Design Guide, would merge and diverge directly from the HOV lanes on the left. The ramps would connect to the proposed NE 139<sup>th</sup> Street overpass, allowing priority access for transit vehicles to a proposed Park-and-Ride site adjacent to NE 139<sup>th</sup> Street west of I-5. Provisions could be made to allow traffic to continue in the HOV lane north of the proposed ramps. In the interim, the northbound ramp will be restricted to buses only until an HOV lane is implemented on northbound I-5.

Construction of these drop ramps will require the I-5 mainline to shift outward to accommodate construction of an embanked section in the middle of the highway. Walls will retain the embankment to minimize the footprint and required shift of the mainline. The design meets all criteria presented in the WSDOT Highway Design Manual and the AASHTO Policy on Geometric Design of Highways and Streets, including shoulder width and lane transitions.

The HOV ramps will connect with I-5 HOV lanes south of the interchange. An exception to the fully-directional access policy is requested for the case of these HOV ramps.

#### **NE 134<sup>th</sup> Street Flyover to I-205 South**

The ramp begins at the existing intersection created by the northbound I-205 to NE 134<sup>th</sup> Street off-ramp, crosses I-205, and merges with I-205 southbound traffic approximately 1,050 feet south of the existing merge point. The flyover ramp has additional operational benefits over the loop ramp/existing ramp combination, including reducing the need for westbound traffic on 134<sup>th</sup>

Street to travel through the NE 20<sup>th</sup> Avenue intersection to access I-205 southbound. This ramp would replace the existing access point, but the difference in merge location is minimal.

#### Relocate Park-and-Ride, Vicinity of NE 139<sup>th</sup> Street

An alternative site was investigated for a new surface lot Park-and-Ride. The option is located west of I-5 and south of NE 139<sup>th</sup> Street. The proposed site is large enough to accommodate the projected 800 spaces. The site is currently classified as a Class 4 wetland, which is discussed in the Planning and Environmental Process Technical Memorandum (**Appendix F**).

#### Ramp to NE 20<sup>th</sup> Avenue Northbound from the I-205 to NE 134<sup>th</sup> Street Off-Ramp

As part of the preferred operational alternative, an additional northbound off-ramp was designed to connect northbound I-205 to NE 20<sup>th</sup> Avenue northbound. This ramp allows vehicles to access NE 20<sup>th</sup> Avenue northbound (north of NE 134<sup>th</sup> Street), bypassing the NE 20<sup>th</sup> Avenue and NE 134<sup>th</sup> Street intersection. The ramp would diverge from the northbound I-205 to the NE 134<sup>th</sup> Street off-ramp, and stay at grade with and parallel to the I-205 mainline south of the NE 134<sup>th</sup> Street overpass. North of the overpass, it would rise in grade to meet NE 20<sup>th</sup> Avenue at the north side of the NE 20<sup>th</sup> Avenue overpass structure. There is a deep natural drainage that the ramp would have to cross between NE 134<sup>th</sup> Street and NE 20<sup>th</sup> Avenue. A structure to bridge the drainage is proposed. To minimize environmental impacts, the ramp is assumed to be constructed with retaining walls.

#### Ramp to I-205 Southbound from NE 20<sup>th</sup> Avenue Northbound

This ramp would begin from a second right-turn lane at the intersection of Highway 99 with NE 134<sup>th</sup> Street. The first right-turn lane would allow traffic to turn onto NE 134<sup>th</sup> Street eastbound. The second would be a channelized free right turn onto the existing I-205 southbound on-ramp. For the portions of this ramp that are parallel to but separated by barriers from the county roads (20<sup>th</sup> Avenue and 134<sup>th</sup> Street), the design meets current design standards for right turn movements and urban roadways. The roadway width through the turning movements is of adequate size to accommodate a WB-50 design vehicle. Additionally, the acceleration-ramp is fully compliant with WSDOT and AASHTO guidelines. The existing ramp would be modified to merge with the NE 134<sup>th</sup> Street to I-205 southbound flyover ramp. Because this free right turn would be physically separated from NE 134<sup>th</sup> Street, the only movement to this ramp would be from northbound Highway 99. By merging the existing ramp and flyover ramp prior to merging with the freeway, the gore point for the freeway merge is approximately 1,650' south of where the gore point would be for the flyover ramp alone.

### **Access Control**

WSDOT requires access control within 300' of a ramp terminus, or if a side street intersects within 350' of the ramp intersection, 130' additional control along each leg of the side-street intersection. The current interchanges meet access control requirements. None of the proposed improvements would require a loss in access to any nearby property or a deviation from full access control.

### **Ramp Spacing and Weaving Summary**

The proposed interchange configurations meet the WSDOT interchange spacing minimum requirements when measured between gore points.

### **Policy Point Five Conclusions: Design**

The requirements for Policy Point Five of the Access Decision Report are to show that the proposed revised access can be designed to meet or exceed current standards for the Interstate System. The information must be presented in sufficient detail to show that the proposed access can be constructed to full Interstate standards. All elements presented in this report as part of the preferred operational alternative are in compliance with the design guidelines set forth in the WSDOT Highway Design Manual and the AASHTO Policy on Geometric Design of Highways and Streets. Additionally, all ramps terminate at existing intersections currently containing at least one ramp terminal and are designed to applicable standards for roadway intersections.

## **POLICY POINT SIX: OPERATIONAL AND ACCIDENT ANALYSES**

*DM1425 Policy: How will the proposal affect safety and traffic operations now and for the next twenty years?*

Guidance requires a safety and operational analysis of the proposal, as well as analyzing alternatives to access modification using the same analysis. This analysis includes a short-term (opening year, in this case 2005) and long-term (20-year, in this case 2025) analysis. The analysis must demonstrate that the proposed access has no “significant adverse impact” to the Interstate mainline’s safety or operations. The Steering Committee is charged with defining “significant adverse impact”.

A combination of analytical models was used to evaluate traffic operations in the study area and the interchange vicinity. These models, calibrated to existing conditions, used Year 2005 and 2025 travel demand volumes generated by the Regional Transportation Council’s regional travel model to analyze alternatives. Measures of effectiveness included travel time, delay, speed, vehicle density, and LOS. Year 2005 and 2025 forecasts were based on land use forecasts for those years developed by RTC in concert with Clark County and local jurisdictions.

Accident analysis included examining the existing High Accident Corridor on I-5, the potential risk of increased accidents on I-205, and predominant accident types and causes. It has been determined that the primary cause of accidents in the section of I-5 near NE 134<sup>th</sup> Street is due to slowed or stopped vehicles using the northbound off-ramp in peak periods. On I-5 between I-205 and NE 179<sup>th</sup> Street, accidents are primarily due to vehicles changing lanes between the two interchanges.

The proposed interchange modification (preferred operational alternative) at the NE 134<sup>th</sup> Street would include:

- Reconfiguring the northbound on-ramps and southbound off-ramps on I-5 and I-205 to a full diamond interchange at I-5 and NE 134<sup>th</sup> Street, with closure of the existing northbound on-ramp and southbound off-ramp.
- Closing the existing southbound on-ramp to I-205 and replacing it with a southbound flyover ramp to I-205 southbound, with a terminus at the northbound off-ramp signal at NE 134<sup>th</sup> Street. A separate right-turn-only ramp lane from northbound NE 20<sup>th</sup> Avenue onto the I-205 southbound on-ramp will provide additional access to southbound I-205.
- Adding a new ramp from northbound I-205 to northbound NE 20<sup>th</sup> Avenue.
- Adding a new collector crossing of I-5 at NE 139<sup>th</sup> Street to accompany the planned new crossing at NE 154<sup>th</sup> Street. Both crossings would connect NE 10<sup>th</sup> Avenue with NE 20<sup>th</sup> Avenue.
- Relocating the Salmon Creek Park-and-Ride to a location west of I-5.
- Adding new direct-access High Occupancy Vehicle (HOV) ramps from I-5 to the new NE 139<sup>th</sup> Street crossing.
- Continuing to plan for a collector extension at approximately NE 23<sup>rd</sup> Avenue, to connect the northbound I-205 off-ramp with NE 139<sup>th</sup> Street, as shown in Clark County’s Salmon Creek/Fairgrounds Regional Road Plan.

- Moving forward with the proposed Highway 99 realignment project between NE 129<sup>th</sup> Street and NE 139<sup>th</sup> Street.

**Appendix E** contains the traffic operational and safety analysis technical memorandum detailing the various alternatives examined. The following section provides a summary of the operational and accident analysis and conclusions for the preferred operational alternative.

### Analysis Methodology

DM1425 requires an operational analysis consistent with Highway Capacity Manual techniques, with the ability to undertake an independent analysis using HCM. Traditionally, traffic operations are measured by calculating LOS based on Highway Capacity Manual (HCM) techniques. The HCM process uses volumes and lane information to develop a capacity, a volume-to-capacity ratio, speed (for mainline sections) or delay (for intersections), which results in a LOS. For the purposes of this report, Synchro/SimTraffic and CORSIM were used to analyze and evaluate the alternatives.

There are several shortfalls to using HCM techniques that impact the analysis presented here. First, the HCM measures the number of vehicles past a certain point over a specific period of time. However, it does not account well for spatial representation of the traffic situation. For example, at an intersection, the HCM LOS is based on the number of vehicles successfully passing through the intersection during an hour. It does not, however, account for vehicles which arrived at the intersection but could not be served, as they are in a queue. Thus, while the HCM may be calculating a satisfactory LOS, such as LOS C, an intersection may actually have extensive queues which result in much higher delays than what HCM is estimating. This was observed to be the case for the analysis of the 134<sup>th</sup> Street interchange alternatives.

Another shortfall of the HCM algorithm is that it does not account for instances where mainline traffic may be queued or bottlenecked upstream (LOS E/F conditions), but at the point being measured the resultant HCM LOS is acceptable (LOS D). Since many bottlenecks tend to occur prior to or after merge/diverge points (as opposed to at the merge/diverge point), the mainline LOS (or merge/diverge LOS) may be acceptable using HCM calculations, but in actuality traffic is being queued with significant speed reductions and delays.

Furthermore, **Table 1** on page 31 of this report shows very little difference in the HCM LOS between alternatives. Therefore, the resultant link speeds from the traffic simulations were used, as well as observed queuing, slowing, and stoppage of traffic, in comparing the alternatives.

To resolve this, traffic simulations consisting of CORSIM and Synchro/SimTraffic were used. Traffic simulations give a spatial representation to traffic, and graphically animate that traffic flow. Bottleneck locations are easy to observe, and models can be calibrated to existing conditions and validated by comparing field observations of traffic flow to the simulation model. These models also enable a comparison of alternatives by measuring speed at various points along a freeway corridor, which allows LOS to be measured at different locations, rather than the HCM's more generalized analysis. The ability to include the impacts of vehicle queuing and slowing on other vehicles gives a better ability to measure speed along a section of interstate mainline, and also observe queues and slowing where weaving is actually occurring in the model. Finally, the simulation models give an ability to measure and observe the impacts of long weaving sections (greater than 2,500 feet), such as in this case.



The methodology used in the analysis and reported herein uses the resultant CORSIM and Synchro/SimTraffic output speeds and traffic observations. HCM lookup tables are applied to the resultant speeds which result in a LOS. The resultant LOS is reported here, along with the estimated queues and speeds from the simulation modeling.

### **Defining No Significant Adverse Impact**

The safety and operational analysis must demonstrate that the preferred operational alternative does not create significant adverse impacts to the safety and operational aspects of the Interstate. For traffic operations, the steering committee defined this as:

- Ensuring current and future ramp queues will not extend onto the Interstate mainline.
- LOS, as calculated by HCM techniques, cannot degrade compared to the No-Build or local improvement alternatives (i.e., if the No-Build LOS is E, the “build” cannot be lower than E).
- Other operational aspects, such as speed, weaving, or delay, cannot be degraded compared to the no-build or local improvement alternatives scenarios.

For safety, no significant adverse impact is defined as:

- The preferred operational alternative cannot significantly increase the number or severity of accidents at the interchange influence area.
- As additional access points may increase the number of accidents on the Interstate, the increase must be offset by an equal or greater decrease in number and severity of accidents on the surrounding principal arterial system with the preferred operational alternative, provided that the need for the access modification has been established.

### **Staging**

In the interim, the northbound off ramp to NE 139<sup>th</sup> Street would be restricted to buses only. The ramp would be opened to all eligible HOVs and motorcycles when a northbound HOV lane is implemented on I-5. The operational analysis referenced in this chapter is for the ultimate preferred operational alternative. The operational analysis for the interim bus-only configuration is contained in Appendix G.

### **Findings**

**Table 3** below summarizes the results of the Year 2025 alternatives analysis.

**Table 3. Evaluation Results – Year 2025 Analysis**

Criterion	Baseline (No-Build)	Local Improvement Alternatives	Improve Existing Interchanges	Preferred Alternative (134 <sup>th</sup> Street Interchange Modification, Alt. 6)
<i>I-5 PM peak speed (mph), south of NE 134<sup>th</sup> Street</i>	1	2	2	15
<i>PM Peak Mainline LOS Using HCM<sup>3</sup></i>	C	C	C	C
<i>I-5 PM Peak Speed (mph) I-205 to NE 179<sup>th</sup> Street</i>	16	17	17	33
<i>PM Peak Mainline LOS on this section using HCM</i>	E	E	E	D
<i>I-5 AM Peak speed (mph), NE 179<sup>th</sup> Street to I-205</i>	19	41	41	44
<i>I-5 AM peak speed (mph), south of NE 134<sup>th</sup> Street</i>	28	28	29	29
<i>I-205 PM peak speed (mph), south of NE 134<sup>th</sup> Street</i>	24	39	39	32
<i>PM Peak Mainline LOS on this section using HCM</i>	C	C	C	C
<i>I-205 AM peak speed (mph), south of NE 134<sup>th</sup> Street</i>	59	59	59	59
<i>I-5 NB off-ramp 95% Queue Length exceeds ramp length?</i>	Yes	Yes	Yes	No
<i>I-205 NB off-ramp 95% queue length exceeds ramp length?</i>	Yes	Yes	Yes	No
<i>Trip types served by improvements</i>	N/A	Local / Regional <sup>4</sup>	Regional with some local <sup>4</sup>	Regional with some local <sup>4</sup>
<i>I-5 Travel time, SR 500 to WSU Campus (community center) (minutes per trip), General Purpose/HOV)</i>	35 (26)	30 (21)	27 (18)	24 (11)
<i>I-205 Travel time, SR 500 to WSU Campus (community center) (minutes per trip)</i>	28	26	24	22

**Figure 8** shows the Year 2025 queuing and LOS for the No-Build alternative, while **Figure 9** shows the Year 2025 queuing and LOS for the Local Improvements Alternative, which has queuing approximately the same as the Improve Existing interchanges alternative. **Figure 10** shows Year 2025 queuing and LOS for the preferred operational alternative.

The conclusions reached are:

- All alternatives which do not modify access show a high probability of ramp queues extending onto the I-5 and I-205 mainlines in the Design Year 2025, which negatively

<sup>3</sup> As mentioned in the discussion regarding methodology, using the HCM algorithm results in no change in LOS class for any of the alternatives. Speed results from the SimTraffic simulation and analysis have been included to supplement the HCM results and to show that there is an improvement under the Preferred Operational Alternative compared to the other scenarios.

<sup>4</sup> Provision of new I-5 crossings reduces number of local trips through the interchange. Interchange improvements benefit both regional and local trips which are using the interchange in 2025.

impacts mainline operations and safety. Only the preferred operational alternative fully alleviates the queuing problem.

- Only the preferred operational alternative adequately spaces the NE 134<sup>th</sup> Street/NE 20<sup>th</sup> Avenue intersection and the I-205 southbound on-ramp.
- The preferred operational alternative provides some relief to the weaving issue on I-5 between NE 179<sup>th</sup> Street and I-205, which in turn should reduce congestion and accidents along that section of I-5.
- New crossings included in the preferred operational alternative help to relieve congestion on NE 134<sup>th</sup> Street, which in turn relieve ramp queuing and delay.



**Figure 8. 2025 No-Build PM Peak Queuing and Level of Service**



**Figure 9. 2025 Local Improvements – PM Peak Queuing and Level of Service**





**Figure 10. 2025 Preferred – PM Peak Queuing and Level of Service**



### **Accident Analysis for the Preferred Operational Alternative**

Accident analysis included examination of the existing High Accident Corridor on I-5 and potential risk of increased accidents on I-205, and predominant accident types and causes. It has been determined that the primary cause of accidents in the section of I-5 in the vicinity of 134<sup>th</sup> Street is due to slowed or stopped vehicles using the northbound off-ramp in peak periods. Additionally, on I-5 between I-205 and NE 179<sup>th</sup> Street accidents are primarily due to vehicles changing lanes between the two interchanges.

The preferred operational alternative is projected to reduce the queues spilling onto the mainline, which suggests a likely reduction in the number of accidents as well since most are attributed to slowed or stopped vehicles. Additionally, the expected reduction in lane changes necessary will also contribute to fewer accidents in the future in both directions on the section of I-5 between I-205 and NE 179<sup>th</sup> Street. Both the projected reduction in queue lengths and number of lane changes will contribute to a safer travel corridor.

### **Policy Point Six Conclusions: Safety and Operational Analysis**

It is concluded that under the safety and operational analysis, the only alternative that provides maximum safety and operational benefits is the NE 134<sup>th</sup> Street interchange. It is the only alternative which eliminates future ramp queues from extending onto the I-5 and I-205 mainlines. It also provides for significant improvements on NE 134<sup>th</sup> Street through the interchange area, as well as contributes to a reduction in weaving maneuvers on the I-5 section between I-5 and NE 179<sup>th</sup> Street which should reduce accidents and congestion along that section of I-5. Northbound HOV queues in year 2025 will not extend onto mainline I-5. Northbound HOV queues in year 2025 will not extend onto mainline I-5.



## POLICY POINT SEVEN: COORDINATION

*DM1425 Policy: Are all coordination projects and actions programmed and funded?*

Policy Point Seven is intended to ensure that when a new or revised access is generated by new or expanding private development, there is a commitment to ensure the following:

- Appropriate coordination between the proposed development and changes to the transportation system.
- Completion of the non-interchange improvement that is necessary for the interchange to function as proposed.

A Steering Committee comprised of technical representatives from WSDOT, FHWA, Clark County, C-TRAN, and the Regional Transportation Council provided agency coordination during the alternatives analysis and production of this report. A public involvement process provided outreach and opportunities for public input on study findings and design alternatives.

The most significant aspect of coordination for implementation of this project is between Clark County, FHWA, WSDOT, and C-TRAN. Clark County has Comprehensive Plan and land use jurisdiction in the vicinity of the interchange. Several development proposals, including expansion of the nearby Washington State University Salmon Creek Campus, a large commercial center, and a new hospital, are currently under consideration with ongoing coordination occurring between Clark County and WSDOT.

Currently, the Comprehensive Plan designation is commercial, industrial, and residential surrounding the interchange. The County is considering an interchange area management policy that will provide for mitigation if there is a change in Comprehensive Plan designation(s) in the interchange vicinity. This will protect the integrity of traffic operations on I-5 and the NE 134<sup>th</sup> Street interchange.

For this modified access request, Clark County and WSDOT are working together to develop Interchange Area Management policies and practices to protect the long-term integrity of this interchange.

WSDOT owns the land on which C-TRAN currently operates the Salmon Creek Park-and-Ride. Any changes to the site (or relocation of the site) and its operations will need to be coordinated between WSDOT and C-TRAN.

**Figure 11** on page 63 shows the known private and public projects in the interchange vicinity.

### Funding

Pending a finding of engineering and operational feasibility by the FHWA, funding will be sought to initiate the NEPA process to gain federal approval for construction of the preferred operational alternative. The ability of WSDOT and local agency partners to locate full funding for this and similar projects depends upon the outcome of the alternatives analyses conducted during the Access Point Decision Report, and then NEPA. These two federal approval processes necessarily prohibit prior determination of a final project concept. It is difficult,

therefore, to secure advance funding. However, appropriate commitments by WSDOT and local partners are in place to ensure timely and coordinated funding of all project elements.

Clark County currently has fully funded, with the use of grant funds, the Highway 99 Realignment Project. This project would realign and widen Highway 99 from NE 129<sup>th</sup> Street to NE 139<sup>th</sup> Street, using the NE 20<sup>th</sup> Avenue alignment. Clark County has designed and programmed funds for improvements to NE 134<sup>th</sup> Street east of I-205.

C-TRAN has committed to shifting bus operations to the relocated Salmon Creek Park-and-Ride if this occurs. C-TRAN has also discussed its limited ability to provide potential funding support for the project, but is supportive of the relocated and expanded Park-and-Ride, as well as for the HOV ramps and NE 139<sup>th</sup> Street crossing.

Interchange improvements are included in the WSDOT Highway System Plan. Local improvements are contained within Clark County's comprehensive plan.

### **Development**

At this time, there are no development proposals that are driving the need for the access modification. However, there are public and private projects that may be impacted by, or have an impact on the modified access project.

The adjacent private development proposals under review include a major commercial center and a new hospital proposed on land adjacent to the interchange, and other development proposals along the NE 134<sup>th</sup> Street corridor. Clark County has indicated that without further improvements under their Concurrency Ordinance, no further development that adds to traffic delays in the corridor will be allowed to proceed.

### **Agency Coordination**

Coordination between agencies has occurred at various levels during the Access Decision Study. These include:

- Steering Committee: Clark County, FHWA, C-TRAN, WSDOT, and RTC are members of the NE 134<sup>th</sup> Street Interchange Access Decision Study Steering Committee. Agency representatives have reviewed design and operational alternatives.
- Development Review: WSDOT coordinates with Clark County on the development review process, including any proposals in the interchange vicinity.
- Project Coordination: through staff meetings and the Steering Committee, Clark County and WSDOT have been coordinating on the NE 134<sup>th</sup> Street Interchange study and the Highway 99 Realignment design.
- Funding: through the regional planning process and the Steering Committee, FHWA, Clark County, WSDOT, C-TRAN, and RTC have discussed funding strategies for I-5 improvements that would include this interchange. RTC, through the Metropolitan Transportation Plan priorities process, has identified I-5 improvements as the region's top interstate priority.

## **Public Involvement**

### **General Information**

The project team held five open houses to share project information with the community, and to listen to input from those directly affected by the project. They were held in March 1999, May 1999, October 1999, August 2000, and November 2000 at a variety of locations and activity centers in the project area.

Early in the process, there were very few comments regarding the NE 134<sup>th</sup> Interchange. Citizens concerned with the interchange became more engaged in the process at the last two open houses. There were two reasons for the delayed engagement: early on there was more concern about NE 179<sup>th</sup> Street / NE 219<sup>th</sup> Street, and as the public process evolved (including a Citizen's Advisory Team), more people became aware of the project and its potential impacts.

Citizens were most concerned with the worsening congestion problem, its impact on small businesses in the area, and the fact that the existing Park-and-Ride is at capacity. Recommendations included adding an overpass at NE 139<sup>th</sup> Street, relocating the Park-and-Ride, and reviewing local street improvements.

### **Private Sector Commitments**

There are no private sector commitments as part of this proposal. Development proposals are being reviewed and coordinated by Clark County and WSDOT to ensure that they will not preclude the preferred operational alternative from occurring.

### **Transportation System/Demand Management Commitments**

As part of the preferred operational alternative, the Salmon Creek Park-and-Ride will be relocated and expanded. HOV ramps connecting I-5's planned HOV lanes with the 139<sup>th</sup> Street crossing will provide significantly improved access to and from the Park-and-Ride. WSDOT and Clark County continue to coordinate on improved traffic signal coordination along NE 134<sup>th</sup> Street, as well as on Highway 99 (the parallel arterial to I-5). WSDOT is giving long-term consideration to ramp metering for the southbound on-ramps to I-5 and I-205 from 134<sup>th</sup> Street, and may consider using ramp meters for the northbound on-ramp in the future to mitigate for projected LOS E conditions on I-5. C-TRAN is committed to continuing to serve the Salmon Creek Park-and-Ride.

### **Policy Point Seven Findings: Coordination**

Through the Steering Committee and local agency processes, Clark County and WSDOT have developed an interagency coordination process to identify the transportation improvements, mitigation, project phasing, funding and construction responsibilities, and transportation demand management and transportation system management commitments necessary to ensure that the revised access will function as intended. All components of the preferred operational alternative are necessary for the improvements to function consistent with the purpose and needs statement. Funds are available for a portion of the preferred operational alternative; other funding is being sought for remaining components of the improvement.





**Figure 11. Public and Private Development Proposals in Interchange Vicinity**



## **POLICY POINT EIGHT: PLANNING AND ENVIRONMENTAL PROCESS**

*DM1425 Policy: What is the status of the proposal's planning and environmental processes?*

Guidance requires an analysis of environmental impacts to support a federal action (FHWA's finding of operational acceptability of the access modification request). An environmental alternatives analysis was conducted to:

- Coordinate the planning and environmental processes, including the National Environmental Policy Act (NEPA), with design and operational determinations.
- Describe potential environmental impacts of the alternatives that may affect design and operational analysis.

The coordination of planning with environmental processes is described in this chapter. Also included is a description of the potential environmental impacts associated with the proposed access modification. Further detail on the environmental resources and potential impacts is provided in **Appendix F**.

### **Planning and Environmental Review**

#### ***Process***

An environmental study plan was drafted and distributed to the Project Steering Committee in February 2001. This plan provided guidelines for an environmental alternatives analysis that would be conducted to support this report. The environmental alternatives analysis serves as a preliminary environmental screening of alternative design options that will be evaluated in the *Access Decision Report*.

#### ***Status***

A more comprehensive environmental analysis of the alternatives, including compliance with NEPA, the Endangered Species Act, Section 404 of the Clean Water Act, the Clean Air Act, and other applicable federal, state, and local regulations, will occur after a finding of operational and engineering acceptability by the Federal Highway Administration (FHWA) is made. At that time, the class of action (I, II, or III) for the project will be determined, which will prescribe the level of documentation needed for the NEPA process. Subsequent steps in the environmental review will include drafting, circulating, and finalizing the NEPA document; incorporating public input; submitting the document for approval; and obtaining other applicable permits and approvals.

#### ***Study Area***

The study area analyzed in the environmental alternatives analysis was defined as 500 feet on each side of the centerline for mainline I-5 and I-205. At interchanges, the study corridor width extends 1,000 feet on each side of the I-5 and I-205 centerline. The length of the study corridor begins at I-205 and NE 83<sup>rd</sup> Street and ends at I-5 and NE 179<sup>th</sup> Street. Proposed Park-and-Ride areas were also included in the environmental study area.

### **Critical Environmental Resources**

The Project Steering Committee identified the following critical environmental resources for early consideration in the project planning and design process: wetlands, fish passage, cultural resources, and hazardous material sites. A preliminary analysis of these resources was completed to determine whether any environmental fatal flaws were included in the design options being considered.

The methods used to identify and evaluate each of the critical resources are briefly summarized as follows:

- Wetlands and fish passage areas were identified and characterized by using available records (aerial photographs, wetland inventories, and soil surveys) and performing limited field reconnaissance for areas within public rights-of-way.
- Cultural resources were identified through a literature search of documents on file at the Washington State Office of Archaeology and Historic Preservation.
- Hazardous material sites were identified through searches of regulatory databases, review of site files maintained by the Washington Department of Ecology, and limited reconnaissance activities.

### **Potential Environmental Issues**

The proposed preferred access modification is expected to have the following potential environmental issues:

- 21 acres of mitigated wetlands replacement
- 3 culvert crossings
- 3 cultural resource sites
- 15 hazardous material sites

A more detailed description of the study methods, results, and conclusions and an environmental screening of all design options is provided in **Appendix F**.

### **Wetlands**

The majority of wetland impacts result from several specific improvements, which are listed below. Additional impacts in several smaller areas are included in the wetlands replacement totals:

- The construction of a relocated Park-and-Ride facility near NE 16<sup>th</sup> Avenue and NE 139<sup>th</sup> Street would involve filling approximately 11 acres of Category 4 wetland (primarily wet agricultural land). The mitigation associated with this activity would result in approximately 14 acres of similar type wetland replacement. This impact would be considerable, but mitigation may be possible considering the degraded character of the impacted wetland.
- The NE 139<sup>th</sup> Street extension from NE 10<sup>th</sup> Avenue to NE 20<sup>th</sup> Avenue would impact approximately 1.8 acres, primarily Category 4 wetlands. Additional improvements

connecting this road extension to I-5 (such as HOV ramps) would impact slightly more wetland area.

- The addition of a new road (NE 23<sup>rd</sup> Avenue) between NE 134<sup>th</sup> and NE 139<sup>th</sup> Streets would account for approximately one acre of wetland disturbance (0.3 acre of Category 2 wetland, 0.3 acres of Category 3 wetlands, and 0.4 acres of Category 4 wetlands).
- The northbound off-ramp from I-205 to NE 20<sup>th</sup> Avenue would impact approximately one-third of an acre of Category 2 wetland.
- Several smaller wetlands impacts, such as along NE 154<sup>th</sup> Street, NE 10<sup>th</sup> Avenue and NE 20<sup>th</sup> Avenue.

**Figure 12** displays mapped wetlands for the proposed access modification.



**Figure 12. Mapped Wetland Resources, NE 134<sup>th</sup> Interchange – Preferred Operational Alternative**





### ***Fish Passage***

The proposed access modification would affect three culverts: one under NE 10<sup>th</sup> Avenue, one under I-5 near NE 149<sup>th</sup> Street, and one under NE 17<sup>th</sup> Avenue. Direct impacts to fish passage and habitat associated with existing culverts would be minimal due to the degraded habitat of upstream and downstream stream conditions.

Plans for the proposed new road (NE 23<sup>rd</sup> Avenue) between NE 134<sup>th</sup> and NE 139<sup>th</sup> Streets would need to consider potential fish habitat and water/fish passage in the wetland areas. Road improvements involving bridges or culverts would need to enable connective fish passage and maintain potential fish habitat within the Category 2 wetlands just north of NE 134<sup>th</sup> Street and within the Category 3 and 4 wetlands near NE 139<sup>th</sup> Street.

### ***Cultural Resources***

The proposed access modification could potentially impact three prehistoric archaeological sites. When the specific alternatives are developed in a later stage of the project, all of these sites will need to undergo a comprehensive investigation that examines all ground surfaces.

If the project planning process cannot assure the avoidance of prehistoric archaeological sites during construction, these cultural resources would need to be evaluated for their potential significance in relation to the criteria established for the National Register of Historic Places. As part of another unrelated development occurring in the vicinity, two of the three sites are currently being evaluated for eligibility for the National Register. If any site is determined to be eligible or potentially eligible for listing on the National Register, appropriate mitigation may be necessary. Data recovery of a portion of the deposits of prehistoric archaeological sites may be required.

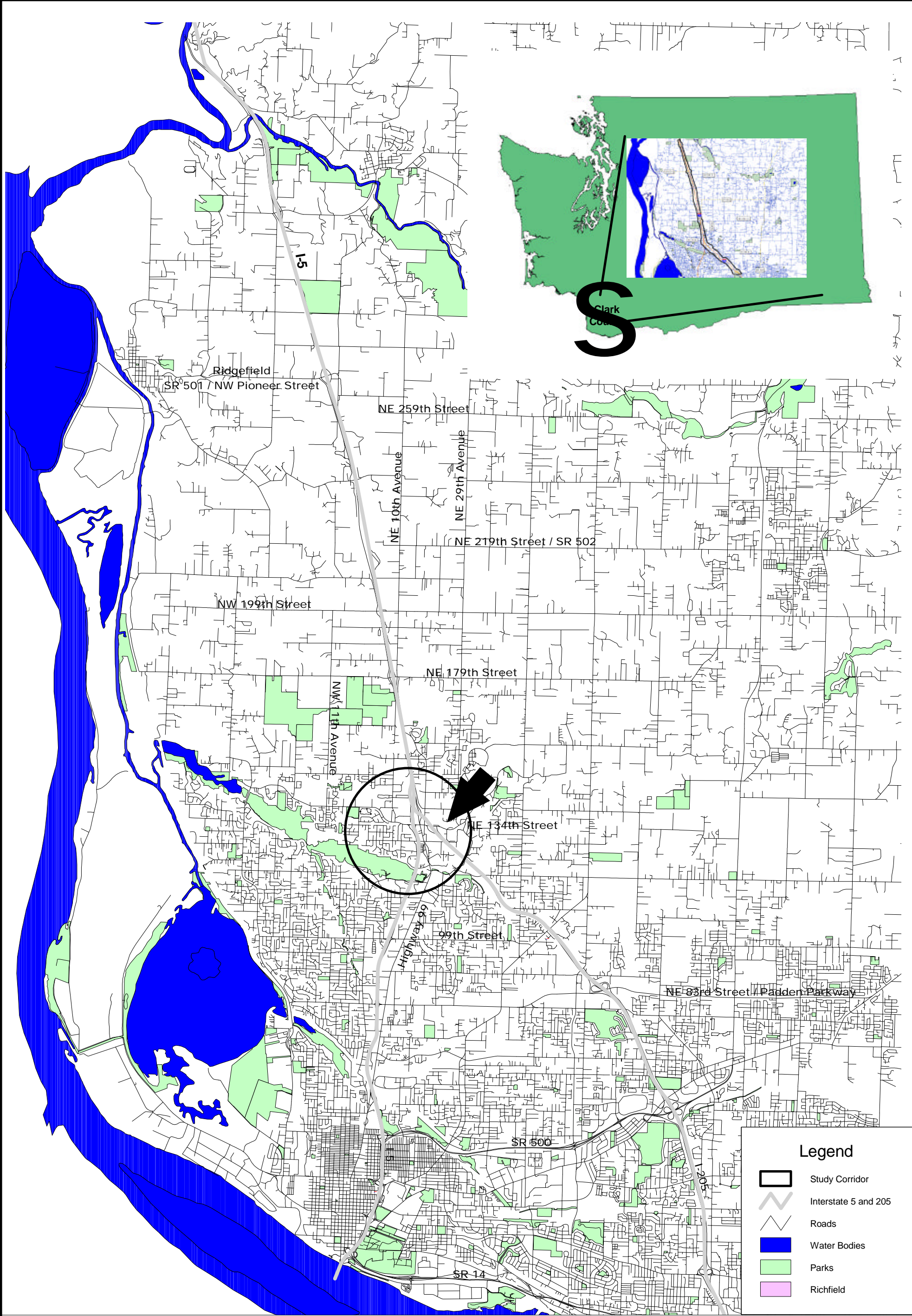
If federal funds or permits are required, all investigations—including inventory, evaluation and determination of significance, and mitigation—will need to be coordinated with the Washington State Office of Archaeology and Historic Preservation and the President's Advisory Council on Historic Preservation.

### ***Hazardous Material Sites***

A total of eight documented hazardous material release sites and seven potential hazardous material release sites would potentially be affected by the proposed preferred access modification. The sites of most concern (high potential sites) are those that have soil or ground water contamination located within or adjacent to proposed construction areas. The proposed access modification has six sites of high potential impact: Vista Mart/L&C Deli, Exxon gas station, Unocal gas station, the Lil' Colonel Drive Inn, the Astro Station/Expressway Food Store, and one private property that has reportedly removed an underground storage tank.

### ***Other Resources***

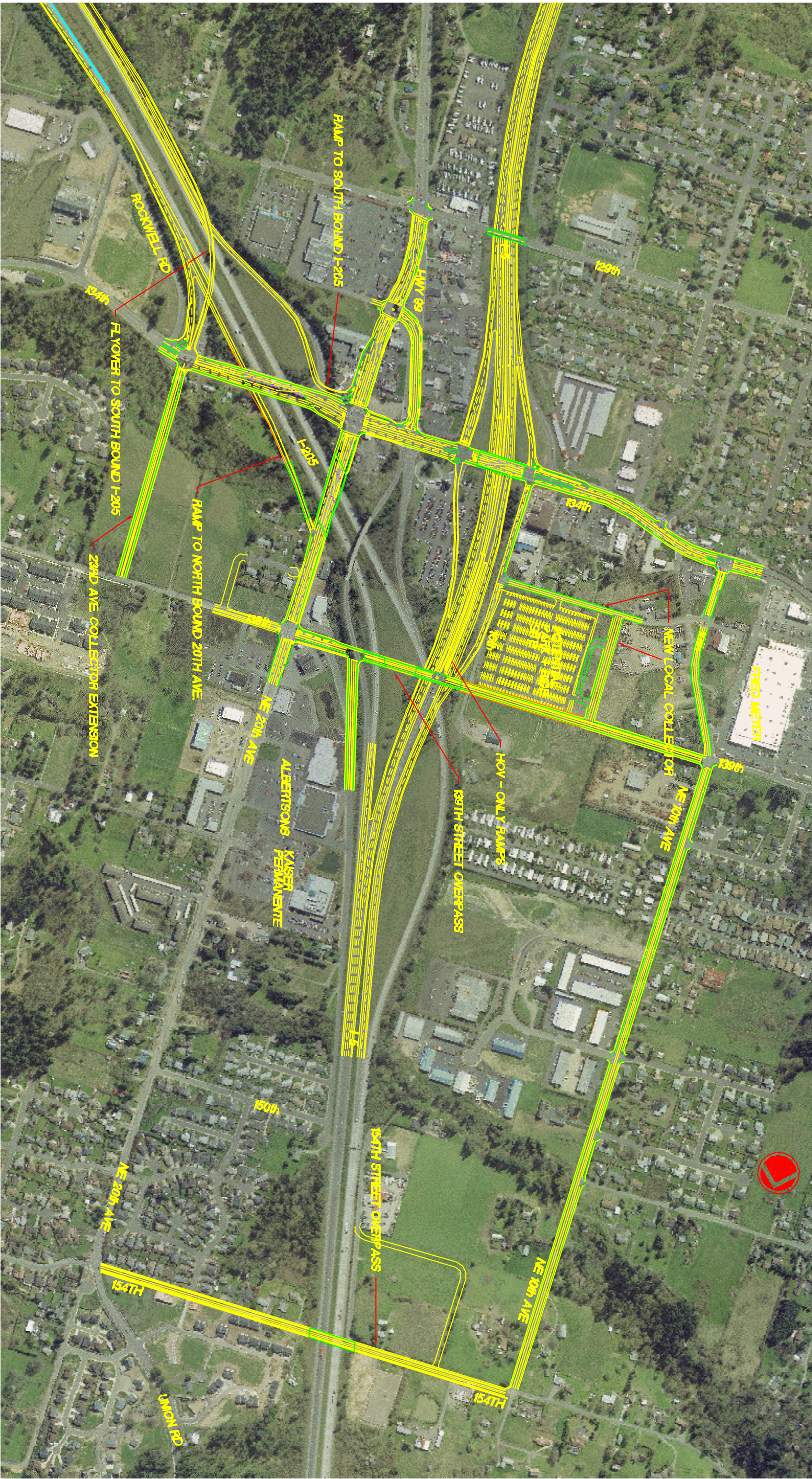
As described in Policy Point Two, the proposed access modification is consistent with local planning requirements. Construction impacts to air quality requirements are expected to conform to local and state regulations by Implementing Best Management Practices. A full analysis of environmental impacts will be undertaken at a later planning stage to comply with applicable federal, state, and local regulations.



**Figure 1**  
**I-5/I-205/134th Interchange**  
**Study Area**







DESIGNED BY	C. HEMMER	12/31/01
CHECKED BY	T. HILDRETH	01/15/02
SCALE	1" = 300'	



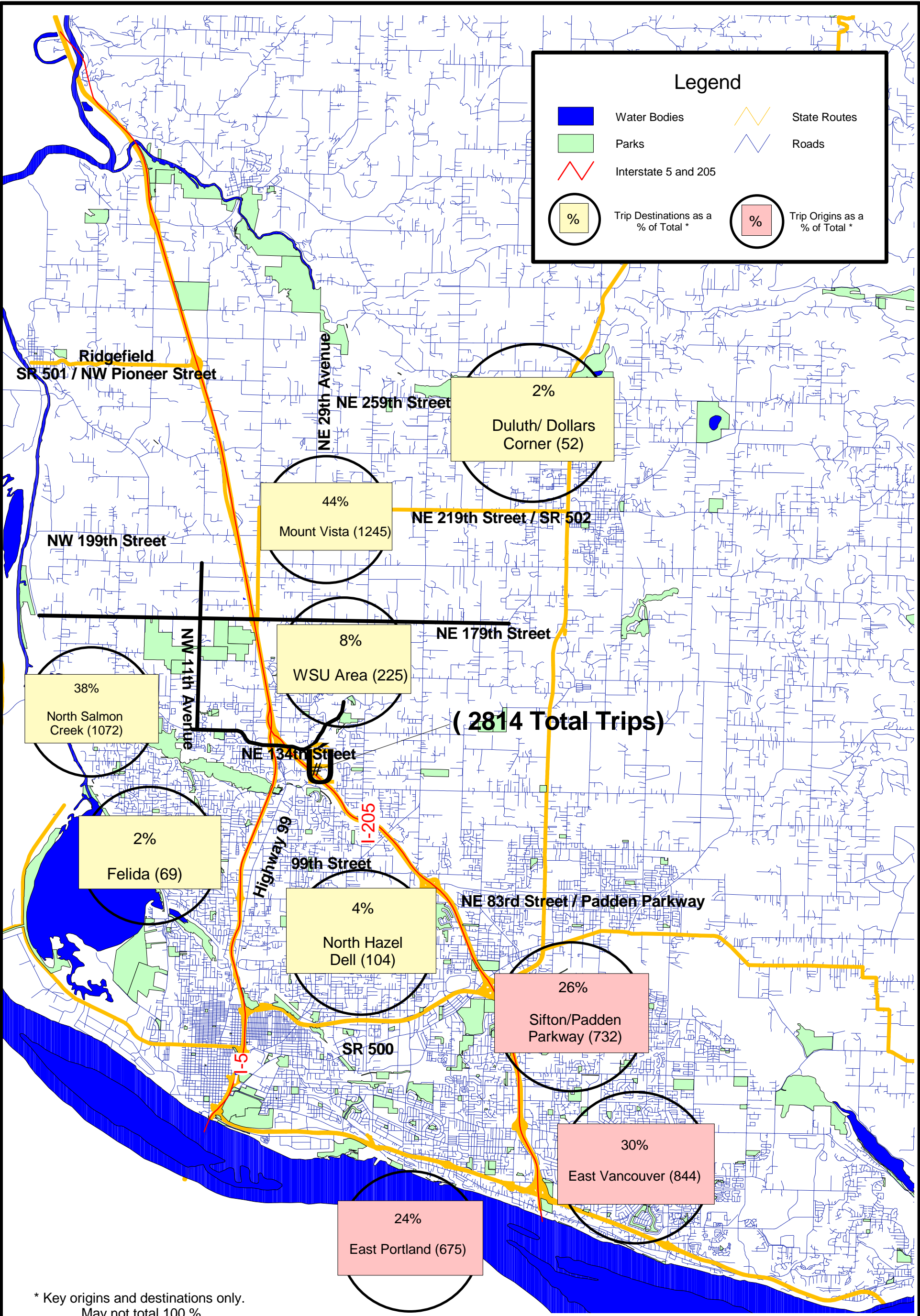


Figure 3  
Year 2025 PM Peak  
I-205/134th Street Trip Origins and  
Destinations To and From the South





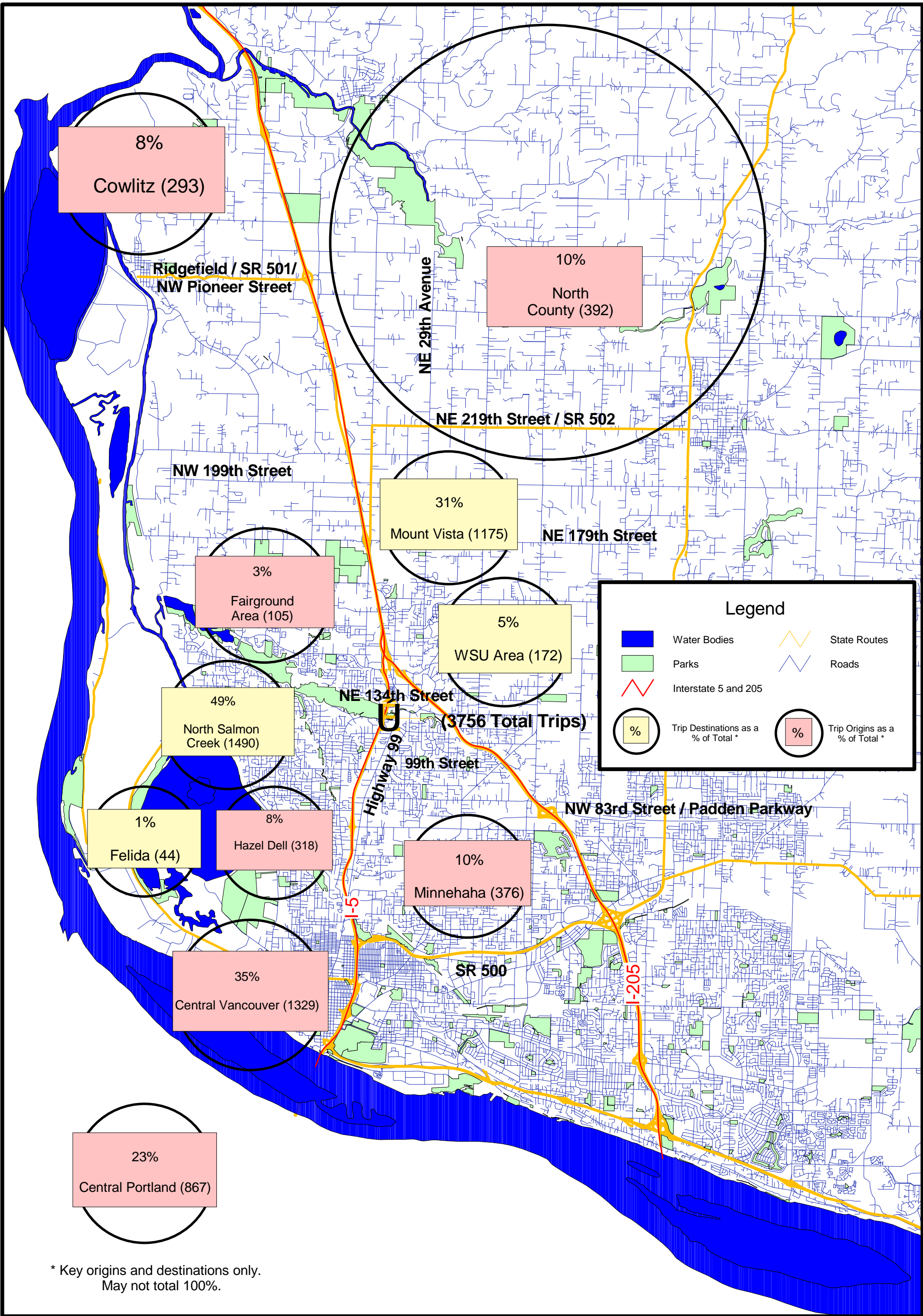
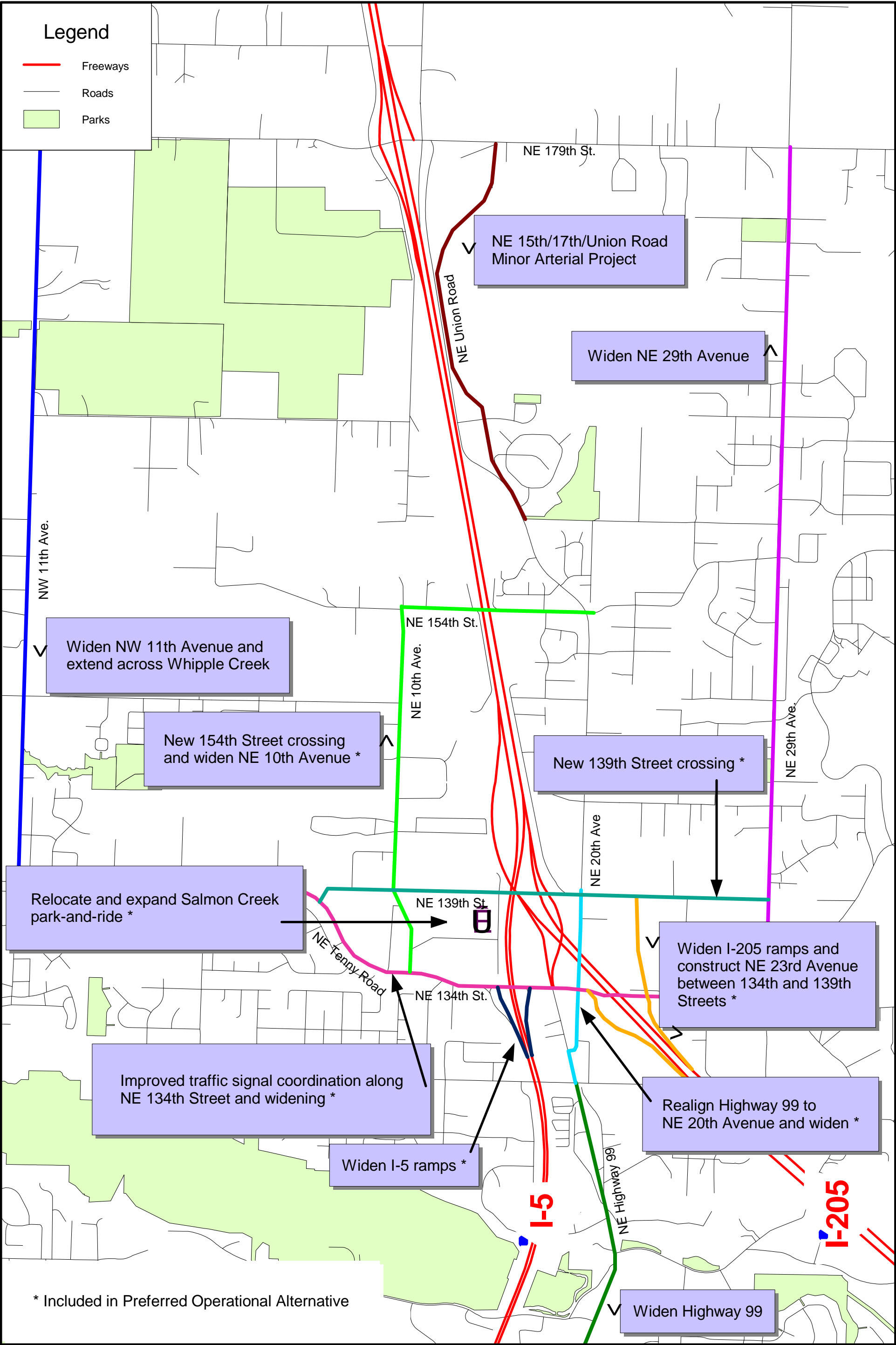


Figure 4  
Year 2025 PM Peak  
I-5/134th Street Trip Origins and Destinations

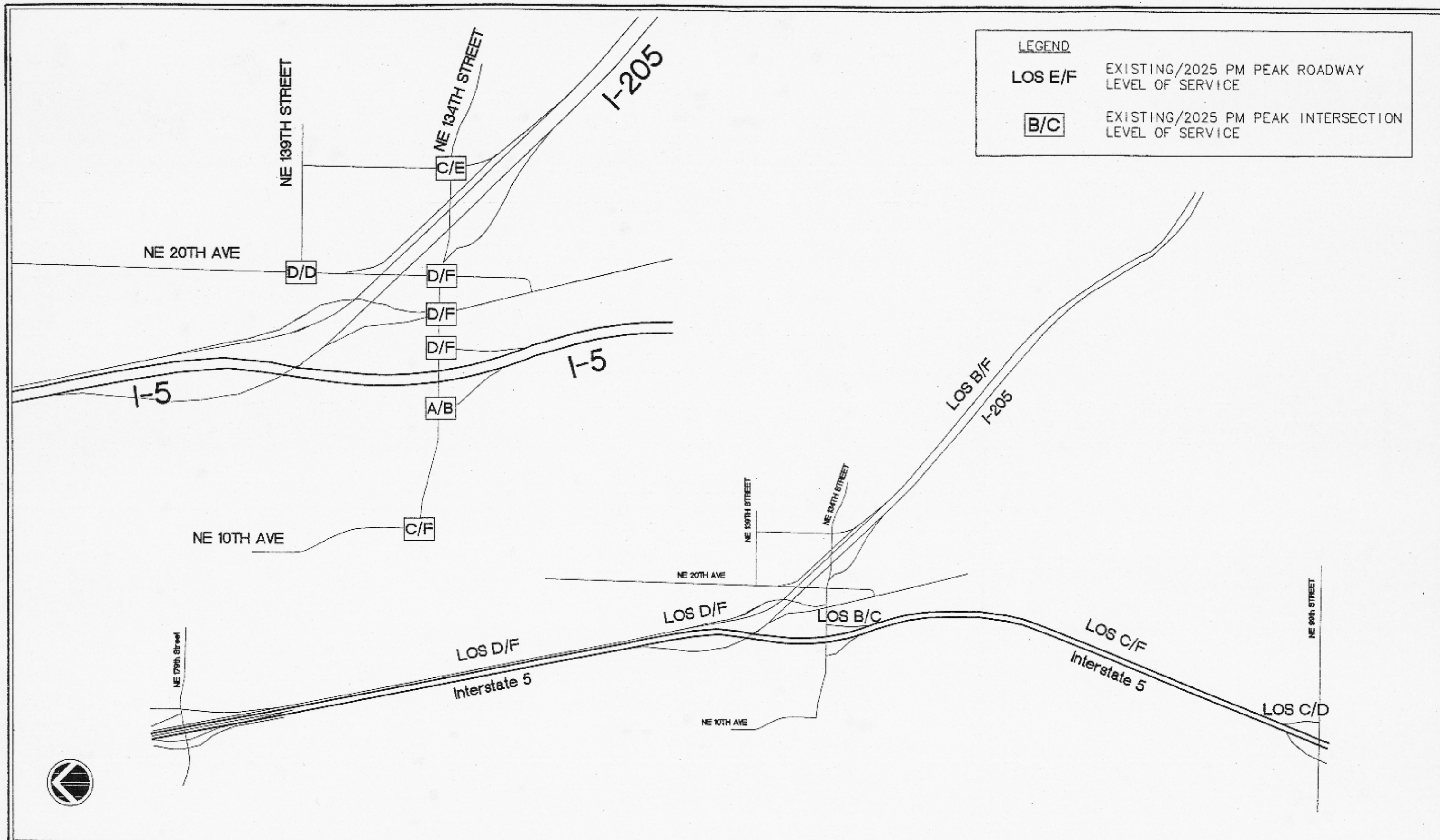




**Figure 5**  
**134th Street Interchange**  
**Local Improvement Alternatives**







DESIGNED BY:	J. Rosales	12/31/01
CHECKED BY:	C. Green	01/15/02
		Rev. 6/02
SCALE:	NTS	



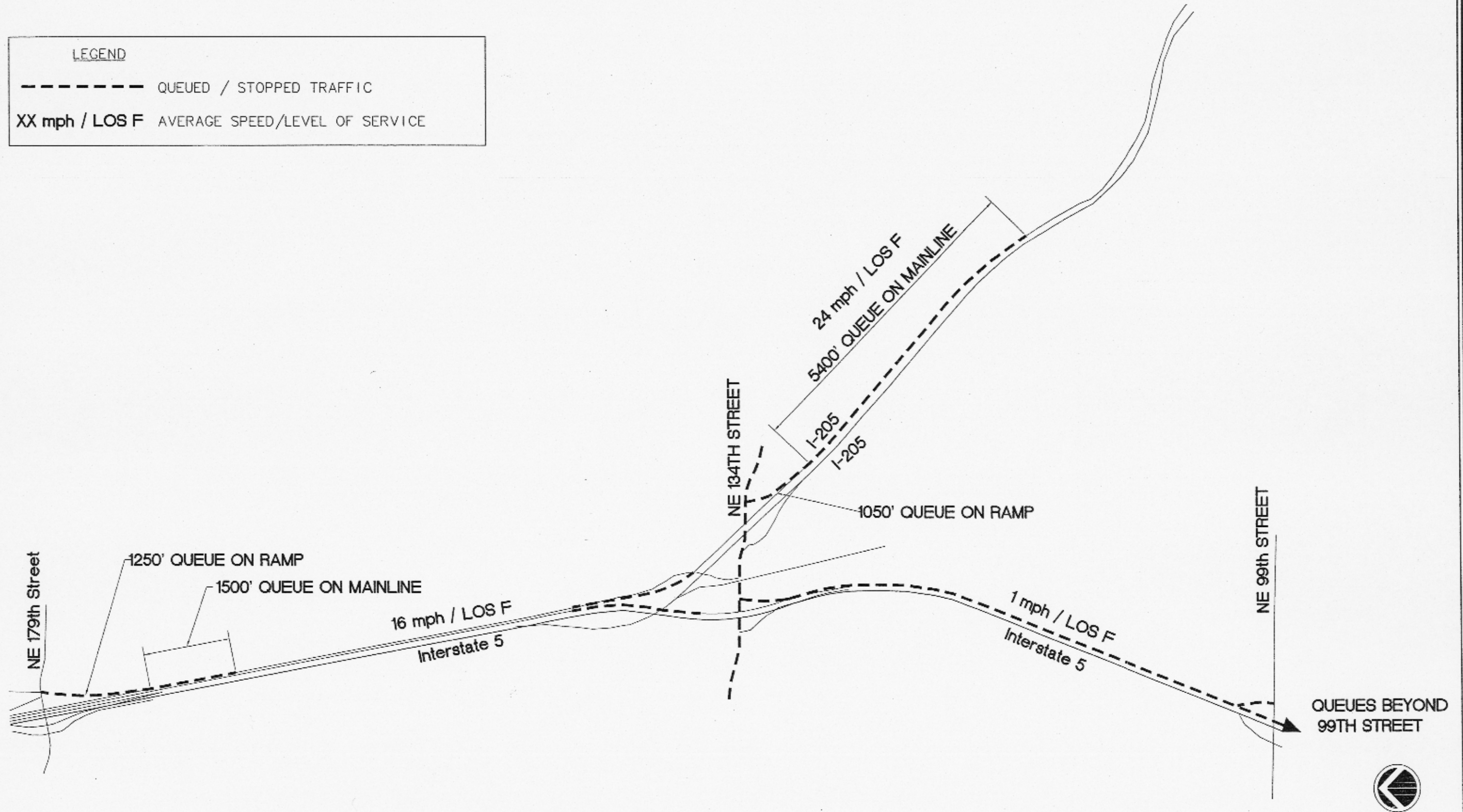
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Figure 7 - I-5 134th Street Interchange

Existing and Future No-Build Level of Service

# LEGEND

----- QUEUED / STOPPED TRAFFIC  
 XX mph / LOS F AVERAGE SPEED/LEVEL OF SERVICE



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Figure 8 - I-5 134th Street Interchange

2025 No-Build PM Peak Queuing and Level of Service

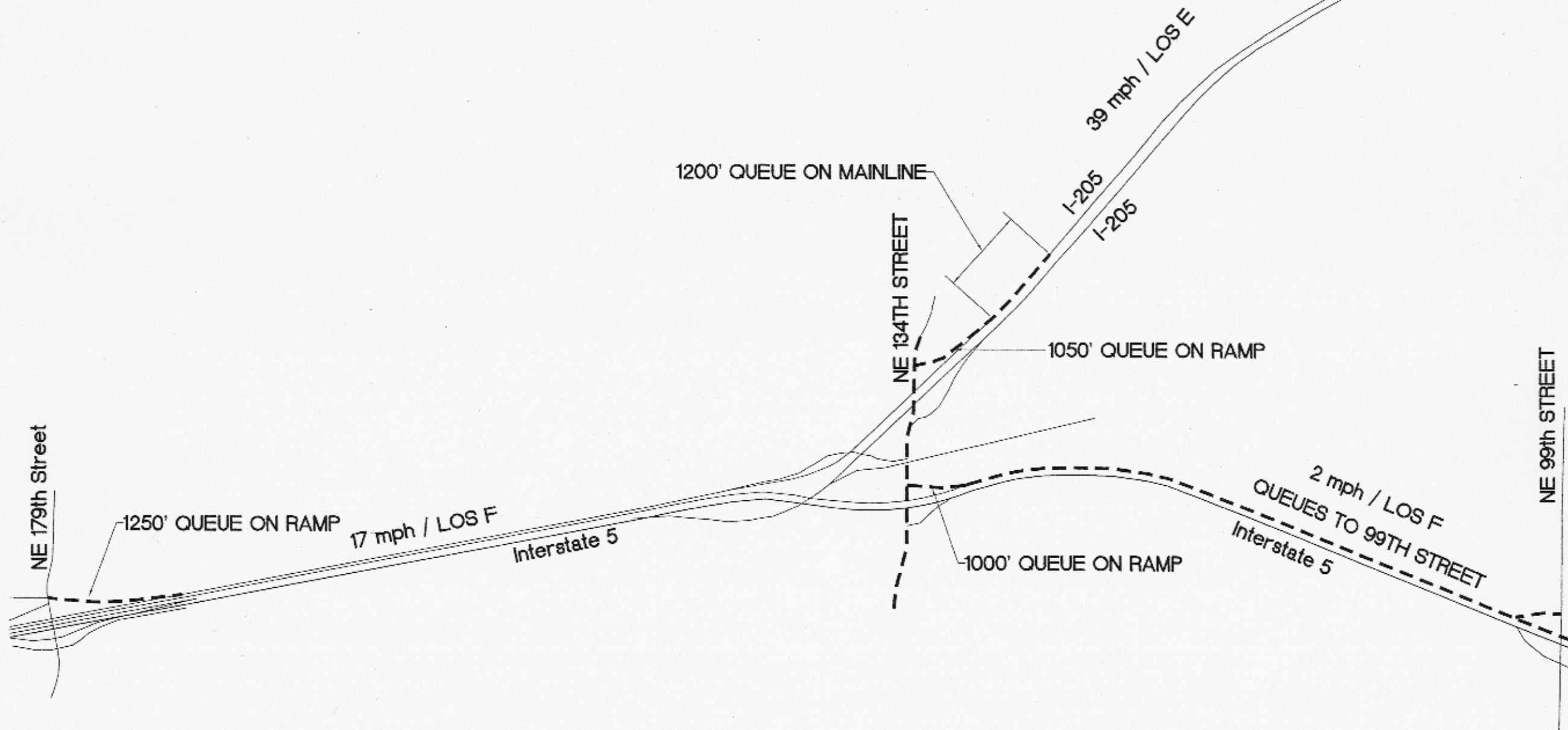
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LEGEND

----- QUEUED / STOPPED TRAFFIC  
XX mph / LOS F AVERAGE SPEED/LEVEL OF SERVICE



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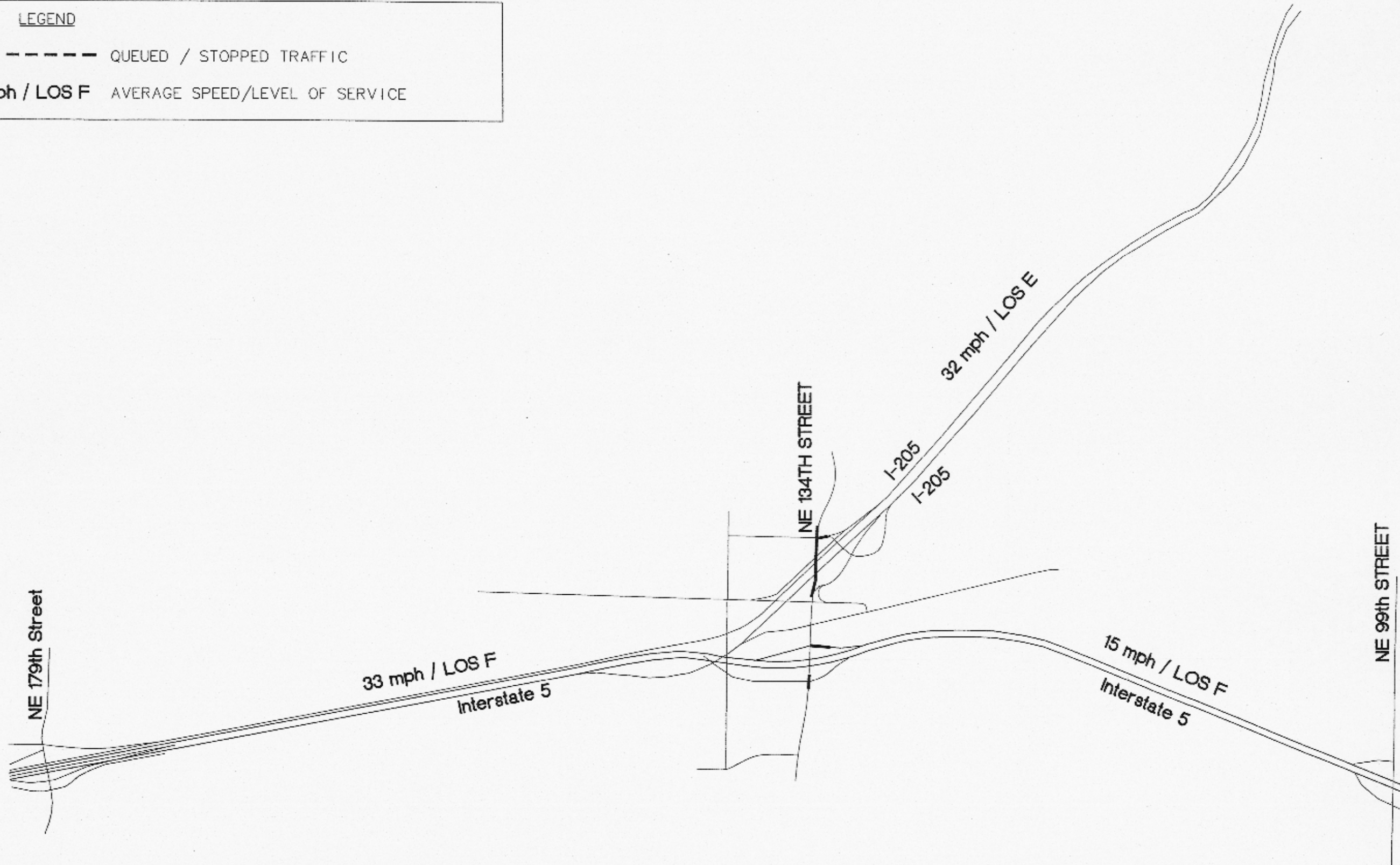
Figure 9 - I-5 134th Street Interchange

2025 Local Improvements - PM Peak Queuing and Level of Service

LEGEND

----- QUEUED / STOPPED TRAFFIC

XX mph / LOS F AVERAGE SPEED/LEVEL OF SERVICE



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CHECKED BY:	C. Green	01/15/02
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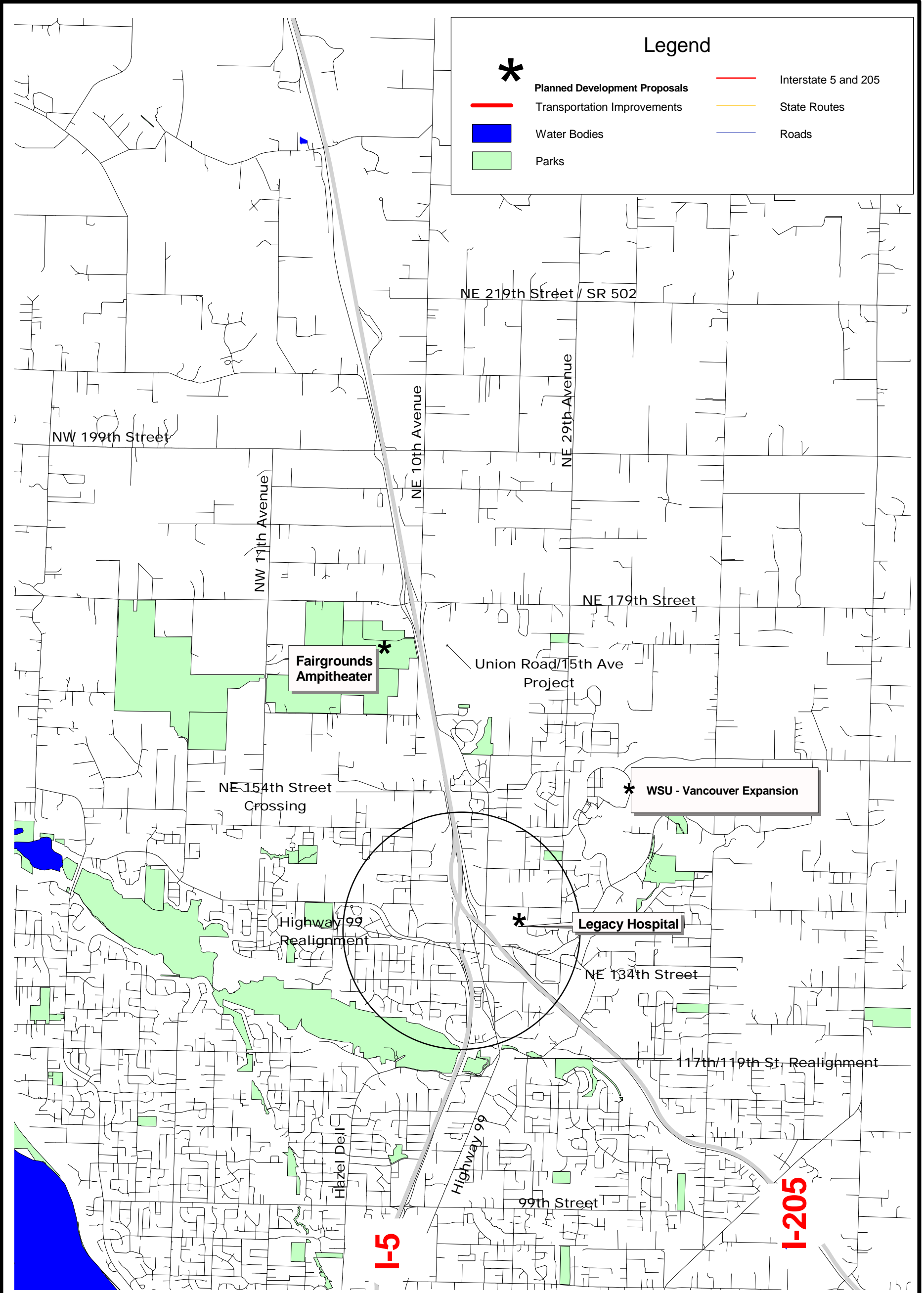


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Figure 10 - I-5 134th Street Interchange

2025 Preferred - PM Peak Queuing and Level of Service





**Figure 11**  
**Public and Private Development**  
**Proposals in Interchange Vicinity**





